



FUTURES EDUCATIONAL SYSTEMS

Practical Learners' Guide

Mathematics

6th Primary
2nd Term

NAME:

CLASS:



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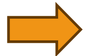
UNIT 8

OPERATIONS ON FRACTIONS AND DECIMALS

lesson 1 : modeling division with fractions and whole numbers.

Lesson 2 : modeling fractions division with tape diagrams .

First : modeling dividing of a whole number by unit fraction:



Remember that : unit fraction is a fraction with 1 as the numerator

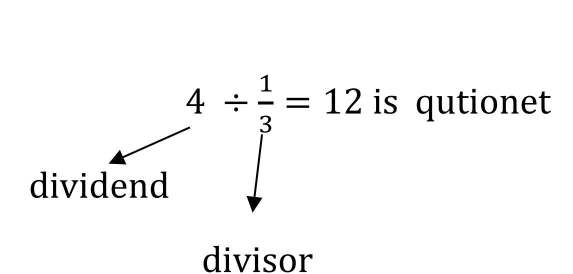
For example : $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$, ...and so on

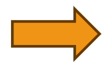
$$4 \div \frac{1}{3}$$

1 whole			1 whole			1 whole			1 whole		
$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$

Then , there are 12 slices of $\frac{1}{3}$ in 4 ,

So .





note that :

$4 \div \frac{1}{3} = 12$, $\frac{1}{3} \div 4 = \frac{1}{12}$

Example: use model to divide then write the quotient:

1) $3 \div \frac{1}{5} =$ .... 2) $\frac{2}{3} \div 3 =$ ....



Exercise 1 : find the quotient :

1)$3 \div \frac{1}{4} =$

2) $3 \div \frac{2}{4} =$

3) $4 \div \frac{5}{6} =$

4) $6 \div \frac{2}{3} =$

5) $5 \div \frac{3}{4} =$

6) $\frac{3}{5} \div \frac{1}{4} =$

7) $\frac{2}{3} \div 3 =$

8) $10 \div \frac{1}{2} =$

9) $\frac{3}{5} \div \frac{3}{10} =$

10) $\frac{9}{10} \div \frac{2}{5} =$

11) $\frac{3}{5} \div \frac{1}{4} =$

12) $\frac{1}{5} \div 2 =$

13) $\frac{3}{4} \div 2 =$

14) $\frac{2}{3} \div 3 =$

15) $\frac{1}{3} \div 6 =$

16) $\frac{7}{8} \div \frac{3}{4} =$

17) $10 \div \frac{2}{5} =$

18) $\frac{5}{6} \div \frac{1}{2} =$

19) $4 \div \frac{1}{2} =$



Exercise 2 : find the answer of the following:

1)how many $\frac{1}{4}$s are in 2 ? …………………………………………………………………………

2) how many $\frac{1}{8}$s are in $\frac{1}{2}$? ………………………………………………………………………..

3) how many $\frac{2}{6}$s are in 3 ? ………………………………………………………………………...

4) how many $\frac{1}{8}$s are in $\frac{3}{4}$? ………………………………………………………………………

5) how many $\frac{1}{6}$s are in $\frac{1}{3}$? ………………………………………………………………………

6) how many $\frac{1}{4}$s are in $\frac{3}{4}$? ………………………………………………………………………

Exercise 3 : find the answer of the following:

1)A runner covered $\frac{2}{3}$ kilometers in 4 laps. How many kilometers did he nake in one lap ?

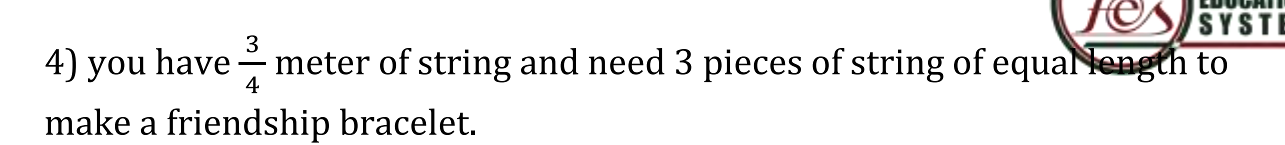
……
……

2) you have $\frac{3}{4}$ meters of pipe.How many pieces can you cut the pipe into if each piece is $\frac{1}{8}$ meter ?

……
……

3) sameh has 6 liters of milk. He needs to divide it into small bottels of $\frac{3}{4}$ Liters each. How many bottels will he need ?

……
……



4) you have $\frac{3}{4}$ meter of string and need 3 pieces of string of equal length to make a friendship bracelet.

A) how could you determine the length of each piece of string ?

……………………………………………………………………………………………………

……………………………………………………………………………………………………

5) you have $\frac{9}{10}$ kilogram of clay. You want to make portions that are $\frac{2}{5}$ kilogram each.

a) draw the model would represent sharing $\frac{9}{10}$ kg of clay in $\frac{2}{5}$ kg portions.

……………………………………………………………………………………………………

……………………………………………………………………………………………………

b) how many portions can you make ?

……………………………………………………………………………………………………

……………………………………………………………………………………………………

H.W

<u>Choose the correct answer:</u>

1) $\frac{4}{5} \div 2 =$ ……………………………………………………

a) $\frac{8}{5}$ b) $\frac{2}{5}$ c) $\frac{5}{8}$ d) $\frac{1}{5}$

2) $4 \div \frac{1}{3} =$ ……………………………………………………

a) $\frac{4}{3}$ b) $\frac{3}{4}$ c) 12 d) 6

3) $\frac{2}{7} \div 2 =$ ……………………………………………………

a) $\frac{4}{7}$ b) $\frac{1}{7}$ c)7 d) 4

4) $5 \div \frac{3}{6} =$ …………………………………………………..

a) $\frac{15}{6}$ b) $\frac{1}{2}$ c) 10 d) 15



5) $\frac{3}{8} \div \frac{3}{4} =$ ....

a) $\frac{1}{2}$ b) $\frac{9}{32}$ c) 2 d) $1\frac{1}{8}$

6) Noha uses $\frac{4}{9}$ cup of milk to make 2 mugs of Nescafe. How much milk is required to make one mug of Nescafe ?

a) $\frac{1}{9}$ b) $\frac{2}{9}$ c) $\frac{3}{9}$ d) $\frac{4}{9}$

7) $\frac{1}{2} \div 8 =$ ....

a) 4 b) $\frac{1}{4}$ c) $\frac{1}{8}$ d) $\frac{1}{16}$

8) $\frac{2}{3} \div \frac{5}{6} =$ ....

a) $\frac{4}{5}$ b) $\frac{5}{4}$ c)5 d) 4

9) $\frac{1}{2} \div \frac{3}{8} =$ ....

a) $\frac{4}{5}$ b) $\frac{4}{3}$ c)8 d) 3

10) $\frac{1}{2} \div 4 =$ ....

a) 4 b) $\frac{1}{4}$ c) $\frac{1}{8}$ d) $\frac{1}{16}$

11) $\frac{3}{5} \div 3 =$ ....

a) 5 b) $\frac{1}{5}$ c) $\frac{1}{3}$ d) 3

12)$6 \div \frac{1}{2} =$ ....

a) 12 b) $\frac{1}{2}$ c) $\frac{1}{6}$ d) $\frac{1}{12}$

Lesson 3 :Connecting Fraction Multiplication To Fraction Division

Learn 1 : <u>relationship between fraction multiplication and fraction division :</u>

What is $\frac{1}{2}$ of 6 apples ?

The word of indicates division or multiplication

So , $6 \div 2 = 6 \times \frac{1}{2}$

This means : taking half of something relate to dividing by 2 or multiplying by $\frac{1}{2}$

<u>Example 1 :</u>

How can you write $\frac{1}{4}$ of 12 using division and using multiplication ?

<u>Solution :</u>

. using division : $\frac{1}{4}$ of 12 means $12 \div 4$

. using multiplication : $\frac{1}{4}$ of 12 means $12 \times \frac{1}{4}$

. $12 \div 4 = 12 \times \frac{1}{4}$

<u>Ex : complete the table as the example .</u>

	Division expression	Multiplication expression	Number sentence
Example : half of 10	$10 \div 2$	$10 \times \frac{1}{2}$	$10 \div 2 = 10 \times \frac{1}{2}$
a. $\frac{1}{3}$ of 12			
b. Fourth of 20			
c. Fifth of 15			
d. $\frac{1}{7}$ of 21			

<u>Learn 2 : standard algorithm of dividing fraction :</u>



Note : I can write any whole number as a fraction of denominator 1

. $3 = \frac{3}{1}$. $4 = \frac{4}{1}$ $5 = \frac{5}{1}$

Study the patterns below .

$6 \div \frac{3}{1} = 2$	$6 \times \frac{1}{3} = 2$
$12 \div \frac{4}{1} = 3$	$12 \times \frac{1}{4} = 3$
$3 \div \frac{5}{1} = \frac{3}{5}$	$3 \times \frac{1}{5} = \frac{3}{5}$

Note : $\frac{3}{4} \times \frac{4}{3} = 1$, so $\frac{3}{4}$ and $\frac{4}{3}$ are reciprocals .

Reciprocals also called multiplicative inverses.

How to divide fraction by another fraction ?

Frist fraction second fraction

$\frac{1}{4}$ $\div$ $\frac{2}{3}$

Leave exchange reverse

$\frac{1}{4}$ $\times$ $\frac{3}{2}$ $= \frac{1 \times 3}{4 \times 2} = \frac{3}{8}$

Ex : find the missing fraction in each of the following :



a. $\frac{2}{3}$ × …………………... = $\frac{4}{5}$

b. ………………… × $\frac{3}{7}$ = 1

c. $\frac{2}{5}$ ÷ ……………….…... = $\frac{2}{3}$

d. ……………………÷ $\frac{2}{7}$ = 3

e. $\frac{9}{25}$ × …………………… = $\frac{3}{10}$

EXERCISE :

1) write the reciprocal of each of the following :

a. $\frac{3}{10}$ = …………

b. $\frac{1}{15}$ =……………

c. 6 =……………

d. 1 = …………..

e. 0 =…………..

2) find the quotient of each of the following in the simplest form

a. $\frac{2}{5}$ ÷ $\frac{3}{5}$ = ……………………..

b. $\frac{2}{3}$ ÷ $\frac{1}{6}$ = ……………………..

c. $\frac{4}{5}$ ÷ $\frac{1}{2}$ = ……………………..

d. $\frac{2}{3}$ ÷ $\frac{3}{7}$ = ……………………..

e. $\frac{3}{8}$ ÷ $\frac{3}{4}$ = ……………………..

f. $\frac{7}{9}$ ÷ $\frac{7}{12}$ = ……………………..

g. $\frac{2}{7}$ ÷ $\frac{5}{7}$ = ……………………..



h. $\frac{4}{10} \div \frac{6}{10}$ = ……………………..

i. $\frac{6}{7} \div \frac{8}{21}$ = ……………………..

j. $\frac{1}{2} \div \frac{1}{12}$ = ……………………..

k. $\frac{5}{6} \div \frac{25}{36}$ = …………………….

3) find the result of each of the following . simplify if possible :

a. $6 \div \frac{1}{3}$ = …………………..

b . $12 \div \frac{3}{4}$ = …………………

c . $\frac{1}{4} \div 2$ = …………………..

d . $45 \div \frac{9}{10}$ = …………………

e . $\frac{7}{8} \div 21$ = …………………

f . $8 \div \frac{3}{5}$ = ……………………

g . $\frac{9}{10} \div 3$ = ……………………

4) find the result of each of the following :

a. $\frac{1}{3}$ of $\frac{2}{3}$ =
b. $\frac{2}{3}$ of $\frac{3}{5}$ =
c. $\frac{4}{5}$ of 25=
d. Fourth of 12=

e. $\frac{1}{9}$ of 27=
f. $\frac{1}{2}$ of 10=

g. Fifths of 5 =



WORD PROBLEMS ON DIVIDING FRACTIONS

Answer the following

a. Baking your recipe requires $\frac{2}{3}$ cup of flour , but you have $\frac{3}{4}$ cup of flour .
How many batches can you make ?

……..
……

b . the perimeter of a square – shaped paper is $\frac{6}{11}$ m .

find the length of each side of the paper

……..
……

C . A box table tennis balls weighs $\frac{5}{9}$ of a kilogram . if each ball weighs $\frac{15}{81}$ of a kilogram ,

then how many balls are there in the box ?

……..
……

d . hany wants to make sandwiches for a class picnic with $\frac{2}{9}$ of a kilogram of sugar .

if each sandwiches needs $\frac{3}{18}$ of a kilogram of sugar , then how many sandwiches can be made

……..
……

e .sameh has a piece of metal rod that is $\frac{3}{4}$ of a meter long .he needs to cut pieces

from th rode that are $\frac{5}{16}$ of a meter long each . how many pieces can sameh cut ?

………
………



LESSON 4

Analyzing Multiplying and Dividing Fractions and Decimal

1) Place the decimal point in the product have to write zeroes in the product.

a) 1 . 2
x 2 . 4
2 8 8

b) 1 . 75
x 2 . 3
4 0 2 5

c) 3 . 14
x 0 .0 5
1 5 7 0

d) 6 . 9
x 3
2 0 7

e) 4 . 16
x 0. 4 1
1 7 0 5 6

f) 2 7. 1
x 13 . 4
3 6 3 1 4

g) 0 . 2 4
x 0 . 3 9 8
9 5 5 2

h) 0 . 0 9
x 0 . 3
2 7

i) 0. 00 8
x 7
5 6

2) Find the product:

a) 0 . 15
x 4
…………

b) 2 . 03
x 0 . 07
…………..

c) 9 . 72
x 0 .4 6
……..……

d) 6 . 461
x 28
……..……

e) 1. 374
x 6
……………

f) 9 8. 21
x 0 . 11
………………



3) Find the product of each of the following:

a) 0 .12 x 0 .3 = …………….

b) 0.625 x 0.7 = ………

c) 7.2 x 0.9 = ………………

d) 0.251 x 9 = …………

e) 1.6 x 0.04 = ……………..

f) 0. 6 x 0. 2 = ……………

g) 5.7 x 0.18 = …………….

h) 1.2 x 0.37 = …………

i) 2.37 x 5 = ……………….

j) 1.25 x 0.24 = ………...





4) Complete each of the following:

Example: 3. 5 ÷ 0. 5 = 35 ÷ 5 = 7

a) 3 .6 ÷ 0 .4 = …………….

b) 4 .2 ÷ 0 .7 = ….…….

c) 0. 8 ÷ 0 .2 = ……………

d) 27.2 ÷ 0 .8 = ….…….

e) 0.28 ÷ 0 .04 = …………..

f) 34 .4 ÷ 0 .4 = …………

g) 3 .17 ÷ 0 . 5 = ………….

h) 0.75 ÷ 0 .05= …………

5) Complete each of the following:

a) 2.16 ÷ 7.2 = …………….

b) 55.33 ÷ 0.11 = ….…….

c) 72.36 ÷ 0 .18 = …………

d) 30.24 ÷ 3.6 = ….…….

e) 94.5 ÷ 3.5 = …………..

f) 3.6 ÷ 0 .45 = ……..…….

g) 3 .175 ÷ 2 .5 = ………….

h) 0.75 ÷ 0 .25= …………



6) Find the quotient of each of the following:

a) 9.2 ÷ 2.5 = ……………..

b) 1.32 ÷ 1.1 = ……….

c) 48.48 ÷ 4.8 = ………..

d) 2.64 ÷ 0. 2 = ……….

e) 4.2 ÷ 0.06 = …………..

f) 4.86 ÷ 0.9 = ………….

g) 357 ÷ 0.7 = …………

h) 1.155 ÷ 0.35= ………..

7) Suppose you went to find 3.75 ÷ 0.125 which of these descriptions results in the correct quotient using the smallest whole number divisor? **Show your work and record your answer choice.**

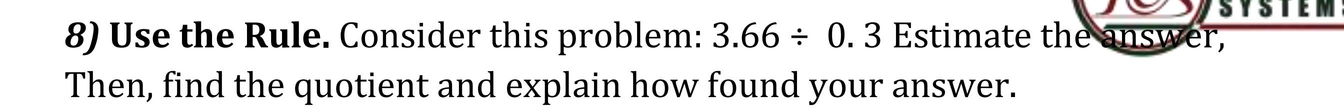
A. Multiply 3.75 by 100 and divide by 0.125

B. Multiply 0.125 by 1000 and divide 3.75 by 125

C. Multiply both 3.75 and 0.125 by 100 and divide 375 by 12.5

D. Multiply both 3.75 and 0.125 by 1,000 and divide 3750 by 125

E. Multiply both 3.75 and 0.125 by 10,000 and divide 37500 by 1,250



8) **Use the Rule.** Consider this problem: 3.66 ÷ 0. 3 Estimate the answer, Then, find the quotient and explain how found your answer.

9) Use the observations you've made so far in this lesson to complete this task Rewrite the explanation by inserting the given words or phrases into the blanks

(divisor – decimal – power of 10 – quotient – whole number – dividend)

To divide by a decimal, I first multiply both the dividend and divisor by the same ……………….. (A) This does not change the value of the quotient and maintains the equality of the expression.

I can rewrite the problem so that I am dividing by a ……… (B) instead of a ……….(C)

Then , I can divide as I normally would.



10) Answer the following problems.



a) Karim Wants to buy 3T-shirts that cost 45.75 L.E each

How much will they cost together?



b) If the price of a can of juice is 19.25 L.E what is the total cost of 25 cans of the same kind?



c) If 362.5 L.E is distributed among the excellent pupils and each of them takes 14.5 L.E

Find the number of excellent pupils.



d) If the price of one meter of cloth is 6.45 L.E what is the cost of 2.4 meters of cloth?



H.W

Choose the correct answer.

1) 2.3 x 4 = …………..

a) 9.2 b) 92 c) 82 d) 7.2

2) 0.56 x 0.2 = ……………

a) 11.12 b) 0.112 c) 11.2 d) 0.0112

3) 0.676 x 0.1 = …………..

a) 67.6 b) 0.0676 c) 16.76 d) 6706

4) 3.4 x 6.2 = ……………..



a) 2.108 b) 21.08 c) 210.8 d) 2108

5) 54.45 ÷ 0.9 = …………

a) 60.5 b) 605 c) 0.605 d) 6.05

6) 4.8 ÷ 0.16 = …………..

a) 3 b) 30 c) 300 d) 0.3

7) 87.29 ÷ 0.29 = 872.9 ÷ ………..

a) 2.9 b) 29 c) 290 d) 0.29

8)327 ÷ 24 = 3.27 ÷ ……………..

a) 2.4 b) 0.24 c) 24 d) 2004

9) If 123 x 45 = 5535 then 1.23 x 4.5 = ……………

a) 5.535 b) 55.35 c) 553.5 d) 5535

10) If 48 x 36 = 1728, then 17.28 ÷ 3.6 = …………

a) 480 b) 48 c) 0.48 d) 4.8

11) If 127.92 ÷ 4.1 = 31.2 then 12.792 ÷ 4.1 = …………

a) 312 b) 0.312 c) 3.12 d) 31.2

12) If you need to buy 1.5 kilograms of apples for your mother at cost of 40.50 L.E per kilogram, how much would you pay?

a) 6,075L.E b) 607.5L.E c) 60.75L.E d) 6.075L.E



Unit 9 : Ratio And Its Applications

Lesson 1 : Exploring Ratio and Rate with Real – life situations .

Ratio :

It is comparing two quatities of the same type (weights , lengths , areas , etc .) . by determining the existing number of one quantity to agiven number of the other quantity.

** The ratio between two numbers :

. a and b can be expressed as the following :

a to b or $\frac{a}{b}$ or a : b

note :

- The number a and b are called (terms of the ratio) .
- The ratio has the same properties as the fraction in terms of simplification and comparison .
- The order of terms of the ratio must be considered when expressing the ratio (a: b $\neq$ $b : a$)
- The ratio between two numbers = $\frac{\text{the first number}}{\text{the second number}}$

** Types of Ratios :

- Ratio between a part and a part .
- Ratio between a part and a whole .

First : comparisons that are ratios

- The ratio between a part and a part .

The ratio of the number of 6 apples to the number of 8 orange

Number of apples		Number of oranges
6	to	8
6	:	8

$\frac{6}{8} = \frac{3}{4}$ (Simplifying)

** that means : the number of apples = $\frac{3}{7}$ total number of fruits for every 3 fruits , 4 of them are apples .

-



- <u>The ratio between part and whole .</u>

The ratio of the number of 6 apples to the number of 14 orange

Number of apples		Number of oranges
6	to	14
6	:	14

$\frac{6}{14} = \frac{3}{7}$ (Simplifying)

** that means : the number of apples = $\frac{3}{7}$ total number of fruits for every 7 fruits , 3 of them are apples .

<u>Second : comparisons that are not ratios</u>

. there are two more oranges than apples .
. the number of apples is two fewer than the number of oranges .

Ex1 : determine whether the following comparisions are ratios or not :

	Comparison	Is a ratio	Is not a ratio
a	There are six students who like art compared to five students who like mathematics .		
b	Seven more students like art than math .		
c	Seven out of twenty –eight students like adventure movies.		
d	Five more students prefer fantasy than drama .		
e	For every student who likes science , two students like math .		



Ex 2: A class has 18 girls and 24 boys . complete in the simplest form the ratio between :

a . the number of girls and the number of boys :

……………… : ………………

$\frac{\dots\dots}{\dots\dots} = \frac{\dots\dots}{\dots\dots}$

Number of girls = $\frac{\dots\dots}{\dots\dots}$ number of boys .

b. the number of boys and the number of girls :

……………… : ………………

$\frac{\dots\dots}{\dots\dots} = \frac{\dots\dots}{\dots\dots}$

Number of boys = $\frac{\dots\dots}{\dots\dots}$ number of girls .

C . the number of girls and the number of class students :

……………… : ………………

$\frac{\dots\dots}{\dots\dots} = \frac{\dots\dots}{\dots\dots}$

Number of girls = $\frac{\dots\dots}{\dots\dots}$ number of class students .

d. the number of boys and the numbers of class students :

……………… : ………………

$\frac{\dots\dots}{\dots\dots} = \frac{\dots\dots}{\dots\dots}$

Number of boys = $\frac{\dots\dots}{\dots\dots}$ number of class students .

Ex 3 : Ahmed had 36 pounds , of whish he spent 27 pounds . what is the ratio between what is left with Ahmed and what he spent ?

……………………………………………………………………………………………………

……………………………………………………………………………………………………

Ex 4 : find the ratio between each of the following in the simplest form :

a. 22 : 66

……………………………



b. 96 : 63

……………………………

……………………………

c. 48 : 72

…………………………………

…………………………………

d. 18 : 48

…………………………………

…………………………………

e. 30 : 20

………………………………

………………………………

f. 5 : 25

………………………………

………………………………

g. 75 : 30

………………………………

………………………………

Remember that :

. perimeter of square = side length × 4

The ratio between the side length of a square to its perimeter is 1 : 4 or $\frac{1}{4}$

The ratio between perimeter of a square to its side length is 4 : 1 or $\frac{4}{1}$ = 4

The ratio between the lengths of two sides of a square is 1: 1 or $\frac{1}{1}$ = 1

. the ratio of the side length of an equilateral triangle to its perimeter is 1: 3 or $\frac{1}{3}$



Rate :

. A rate is a ratio that compares between two quantities that have different units .

.Rate language often uses the words per and for every to describe the relationship .

Ex : Ahmed studies 28 hours a week . find Ahmed`s daily study rate .

Answer : daily study rate : 28 ÷ 7 = 4 hours / day

Answer the following :

1 – Ahmed spends 840 pounds a week . what is his daily spending rate ?

……………………………………………………………………………………………………

……………………………………………………………………………………………………

2 – the car consumes 40 liters to travel 320 kilometers .

What is the fuel consumption rate of the car ?

……………………………………………………………………………………………………..

……………………………………………………………………………………………………

3 – Laila writes 640 words in 16 minutes using the computer .

Calculate the rate of Laila`s typing on the computer .

……………………………………………………………………………………………………

…………………………………………………………………………………………………

Choose the correct answer :

1- A runner covers 110m in 10 seconds , then his rate of covering is ………………m/sec .

(10 – 11 – 1.1 – 110)

FUTURES EDUCATIONAL SYSTEMS

2- the ratio between 32 : 48 (in the simplest form) is ………….. : …………… (2:3 - 2:5 - 3:4 - 1:2)

3- 15 : 20 = ……….. : ………………..

Complete :

a. 4 : 3 = $\frac{\cdots\cdots}{3}$

b. The ratio between the perimeter of an equilateral triangle to its side length is….. : …….

c. If Gehan drinks 21 glasses of milk weekly , then the rate of what she drinks daily is

d. ……….. glasses/ day

e. An oven uses 15 litres of fuel every 3 hours , then the rate of the used fuel =……………… Litre/hour.

f. A factory produces 7200 bottles of soda in 8 hours . what is the rate of production ?
= …………………….. bottles/hours



Lessons 2: Representing Ratio

Learn : using ratios to extend pattern :

Example 1 :

Sarah wants to make a design in her chemise by using colored beads 3 pink and 4 orange .

Pink	Orange	Total
3	4	7
6	A	B
9	C	D
E	20	F
G	H	56

Solution

Since 6÷3 = 2 then A = 4 × 2 = 8 , B= 7 × 2 = 14

Then C = ……… , E = ……… , G = …………..

D =…….. , F = ………. , H = …………

Example 2 :

If the ratio between two number is 7 : 4 and the smaller number is 12 find the greater number .

Solution :

Since $\frac{12}{4} = 3$, then the greater number = 3 × 7 = 21

FUTURES EDUCATIONAL SYSTEMS

Exercise

1) **Complete** .

a. The ratio between a and b is 4 : 5
If a = 20 , then b = …………….

b. The ratio between two number is 2 : 7
If the greater number is 21 , then the smaller number is …………….

c. if the ratio between two number is 4 :3 and the sum of them is 14 , then the two number are ………………. , …………….

d. The ratio between the number of red beads and the number of green beads is 8 : 5

If the number of green beads is 15 , then the number of red beads is ………………….

2) Complete the table for a ratio of 2 red to 3 blue bulbs . look for patterns as you complete your table .

Total of bulbs	Red bulbs	Blue bulbs
5	2	3
10	(A)	(B)
15	(C)	(D)
(E)	10	(F)

3) Choose the correct answer :

1- If the ratio between two numbers is 1: 3 and the first number is 3 , then the second number is …………….

A . 3 B. 6 C. 9 D. 12

2- If the ratio of the number of red balls to the number of blue balls is3 :4 and the number of blue is 24 , then the number of red is …………….

A.18 B. 37 C. 12 D. 44



3- The next ratio of 3 : 6 , 6:12 , 12:24 , …………
A. 24:48 B. 36:72 C. 24 : 27 D. 12 : 48

4- If the ratio between a and b is 1 :4 and the sum of a and b is 20 , b = …………..
A. 16 B . 4 C. 5 D. 80

5- If the ratio between orange and bananas is 3:4 and the number of bananas is 20 , then the difference between them is …………
A. 1 B. 5 C. 15 D. 20

6- If the ratio between two number is 2:5 and the smaller number is 10 , then the greater number is ……………..
A . 4 B. 13 C. 7 D. 25

7- The opposite table shows the ratio between boys and girls , then :

Boys	Girls	Total
5	7	A
B	C	48

The value of A =

A. 5 B . 7 C . 12 D. 48

The value of B =

A. 20 B. 5 C. 28 D.12

The value of C =

A . 48 B. 36 C. 2 D. 8



LESSON 3 : EXPLORING EQUIVALENT RATIOS

Equivalent ratios

ratios that express the same relationship between two quantities are called equivalent ratios.

For example : put 18 : 24 in the simplest form.

$$\frac{18}{24} = \frac{18 \div 6}{24 \div 6} = \frac{3}{4}$$

S0 , 18 : 24 and 3 : 4 are equivalent ratios

Then you can write :

18 : 24 = 3 : 4 or $\frac{18}{24} = \frac{3}{4}$

Example 1 : determine whether the ratios 250 km. in 4 hours and 500 km. in 8 hours are equivalent or not.

Solution :

- 250km. : 4hours = $\frac{250 \div 2}{4 \div 2} = \frac{125}{2}$
- 500km. : 8hours = $\frac{500 \div 4}{8 \div 4} = \frac{125}{2}$
- The ratios simplify to the same fraction, then they are equivalent.

Example 2 : for every 9 square meters of surface, a pond should have 6 fish.

A pond that has a surface of 45 square meters contains 18 fish.

Are these ratios equivalent or not ?

- 9 : 6 = $\frac{9 \div 3}{6 \div 3} = \frac{3}{2}$
- 45 : 15 = $\frac{45 \div 9}{18 \div 9} = \frac{5}{2}$
- The ratios are not equivalent.



How can you find equivalent ratios ?

if you multiply or divide each of two terms of a ratio by the same non-zero number, the result is equivalent to the first ratio.

For example:

1) $\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$

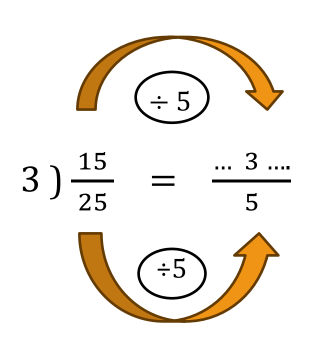
The ratios $\frac{2}{3}$ and $\frac{8}{12}$ are the same , then they are equivalent

$\frac{2}{3} = \frac{8}{12}$ or 2 : 3 = 8 : 12

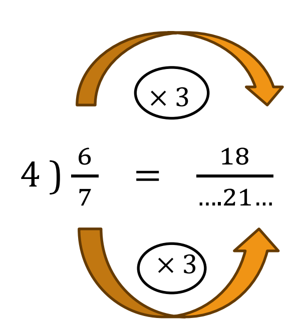
2) $\frac{15}{25} = \frac{15 \div 5}{25 \div 5} = \frac{3}{5}$

The ratios $\frac{15}{25}$ and $\frac{3}{5}$ are the same , then they are equivalent

$\frac{15}{25} = \frac{3}{5}$ or 15 : 25 = 3 : 5



3) $\frac{15}{25} = \frac{\ldots\ 3\ \ldots}{5}$



4) $\frac{6}{7} = \frac{18}{\ldots 21 \ldots}$



Equivalent ratios in table

A box contain 6 pencils.

The following table shows the number of pencils in boxes.

Number of boxes	2	3	4	A	10
Number of pencils	12	18	24	30	B

By using equivalent values find the value of A and B.

………………………………………………………………………………………

Exercise

1)write three ratios that are equivalent to each ratio :

a) 5 : 3

……

b) 2 : 7

……...

2)complete to form an equivalent ratio.

a) $\frac{5}{8} = \frac{\dots\dots}{24}$

b) $\frac{2}{3} = \frac{12}{\dots\dots}$

c) $\frac{7}{9} = \frac{28}{\dots\dots}$

d) $\frac{6}{7} = \frac{60}{\dots\dots}$

e) $\frac{3}{8} = \frac{21}{\dots\dots}$

f) $\frac{3}{5} = \frac{27}{\dots\dots}$

3) a runner covers 8 km. in 2 hours. Find the distance he covers in 4 hours?

…………………………………………………………………………………………..

4) Ahmed bought 3 kg. of banana for 45 L.E. how much money does he pay to buy 6 kg ?

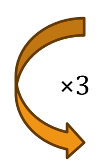
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5)complete to following tables.

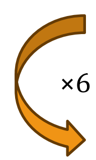


a)



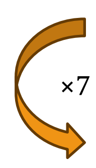
3	4	…….	7	…….
9	……..	18	……	30

b)



2	4	…….	7	…….
12	……..	30	……	54

c)



……	5	…….	8	10
21	……..	42	……	…..

6)determine which of the following are equivalent ratios.

a) 4 L.E for every 16 gram.

10 L.E for every 40 gram.

……………………………………………………………………………………………………

……………………………………………………………………………………………………

b) 8 roses to 6 babies breath.

12 roses to 10 babies breath.

……………………………………………………………………………………………………

……………………………………………………………………………………………………

7) find the value of x :

a) if 2 : 7 is equivalent to x : 21 , then x = ……………………………………………

b) if $\frac{8}{x}$ is equivalent to $\frac{1}{2}$, then x = ……………………………………………………

c) if $\frac{3}{4}$ is equivalent to x : 12 , then x + 5 = ……………………………………………

d) if $\frac{4}{7}$ is equivalent to $\frac{x}{35}$, then x – 3 = ……………………………………………



H.W

complete:

1) $\frac{3}{5} = \frac{27}{\ldots\ldots\ldots}$

2) $\frac{1}{2} = \frac{6}{\ldots\ldots}$

3) $\frac{3}{5} = \frac{\ldots\ldots}{40}$

4) $\frac{5}{8} = \frac{\ldots\ldots}{24}$

5) if 4 : 9 is equivalent to x : 18 , then x = ……………………………………………

………………………………………………………………………………………………………

6) if $\frac{9}{x}$ is equivalent to $\frac{1}{3}$, then x = ……………………………………………………

………………………………………………………………………………………………………

7) if $\frac{2}{9}$ is equivalent to 6 : x , then x + 5 = ……………………………………………..

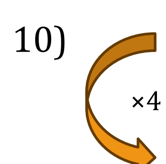
………………………………………………………………………………………………………

8) if $\frac{3}{5}$ is equivalent to $\frac{x}{35}$, then x – 3 = …………………………………………………

………………………………………………………………………………………………………

9) write an equivalent ratio to 3 : 7 .

………………………………………………………………………………………………………

10) 

2	……	5	7	…….
…..	12	……	……	36

11) Amira bought 2kg. of apples for 20 L.E . how much money does she pay to buy 6 kg?

………………………………………………………………………………………………………

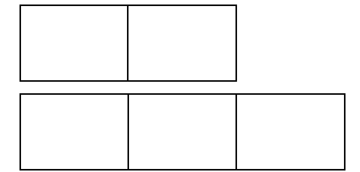
LESSON 4: REPRESENTING RATIOS WITH TAPE DIAGRAMS

LESSON 5: ANALYZING EQUIVALENT RATIOS WITH A NUMBER LINE

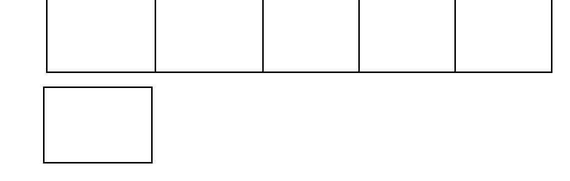
representing ratios by tape diagram

represent the following ratios by tape diagrams:

a) 2 : 3



b) 5 : 1



Example: the ratio of red pens to blue pens in a package is 2 : 5 , if there are 35 blue pens in the package. How many red pens are in the package?

1st : draw the tape diagrams

red					
Blue					

2nd : blue = 35 pens ,

Then each box = 35 ÷ 5 = 7

red					
blue	7	7	7	7	7

3rd : red = 7 × 2 = 14

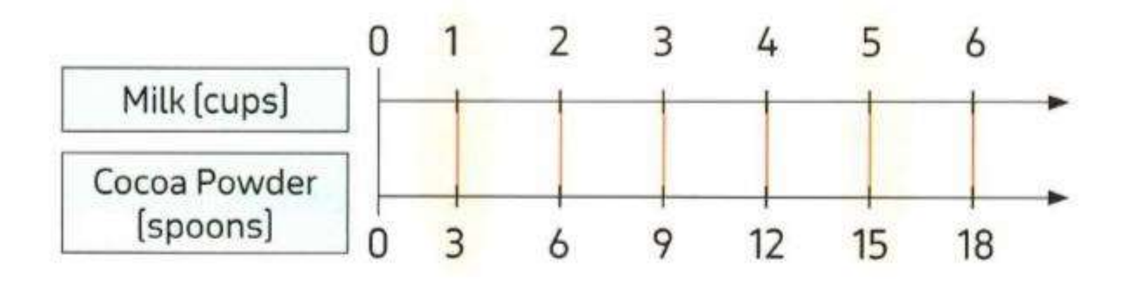
red	7	7			
Blue	7	7	7	7	7



Analyzing equivalent ratios by double number line

Example1: Salwa prepares chocolate milk by mixing 3 spoons of cocoa powder for every cub of milk. The simplest ratio between cups of milk and amount of cocoa powder is 1 : 3 , you can represent multiple batches of chocolate milk by double number line.

Represent 6 batches of the above mix prepared by salwa.



Example2: the opposite table shows the distance in meters travelled by a car and the time taken in seconds.

a) represent this data by double number line.

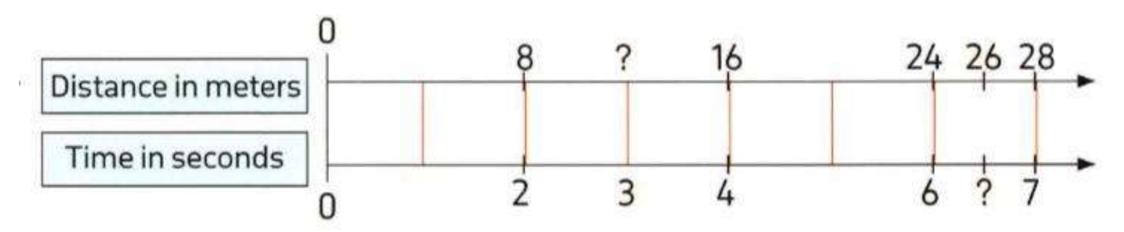
b) what is the travelled distance in 3 seconds?

c) what is the time taken to travel 26 meters?

Distance in meters	Time in seconds
8	2
16	4
24	6
28	7

Solution:

a)



b) $\frac{24}{6} = \frac{?}{3}$, 24 ÷ 2 = 12 meters.

c) $\frac{26}{4} = \frac{13}{2} = 6.5$ seconds.



Exercise:

1) represent each of the following by tape diagrams:

a) 4: 3

…………………………………………………………………………………………………...

b) 3 to 2

…………………………………………………………………………………………………...

c) $\frac{4}{7}$

…………………………………………………………………………………………………..

2) if the ratio between the number of apples and the number of oranges is 2 : 5 and the number of apples is 10, represent by tape diagrams and find the value of each block.

……………………………………………………………………………………………………
……………………………………………………………………………………………………

The value of each block = …………………………………………………………………..

3) if the ratio between boys and girls is 3 : 4 and the number of girls is 20 girls, then find the number of boys using tape diagrams.

……………………………………………………………………………………………………
…………………………………………………………………………………………………..

4) the ratio between the number of red flowers to yellow is 7 : 4. If there are 9 more red flowers than yellow . how many total number of flowers?

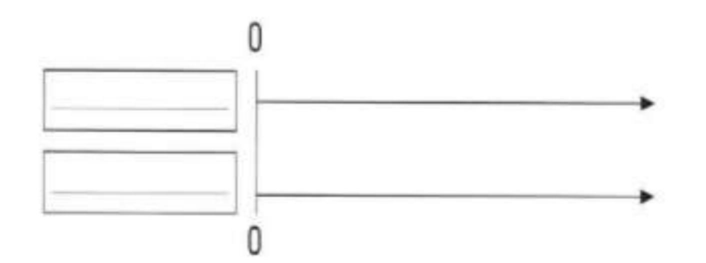
……………………………………………………………………………………………………
…………………………………………………………………………………………………..

5) the ratio between the number of cats and dogs is 2 : 7 and the sum of them is 27. Find the number of each by using tape diagrams.

……………………………………………………………………………………………………
……………………………………………………………………………………………………



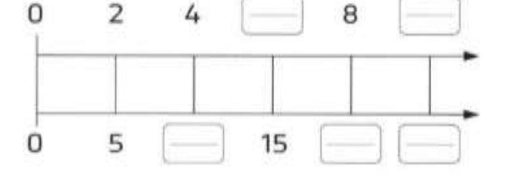
6) represent the opposite table by double number line.



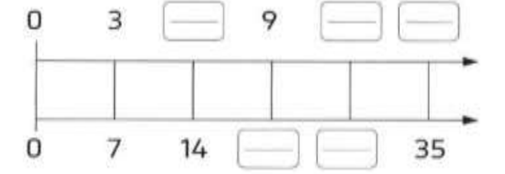
Distance in meters	Time in seconds
2	6
4	12
5	15
6	18

7) complete the following double number line, then write three equivalent ratios:

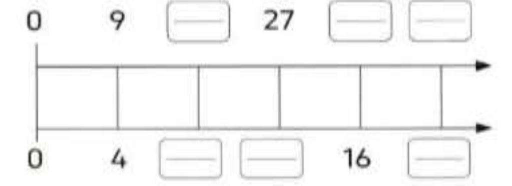
a. 2 : 5



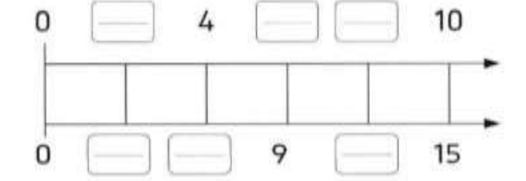
b. 3 : 7



H.W c. 9 : 4



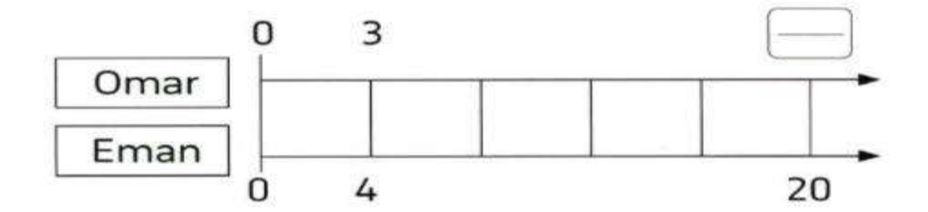
d. 10 : 15



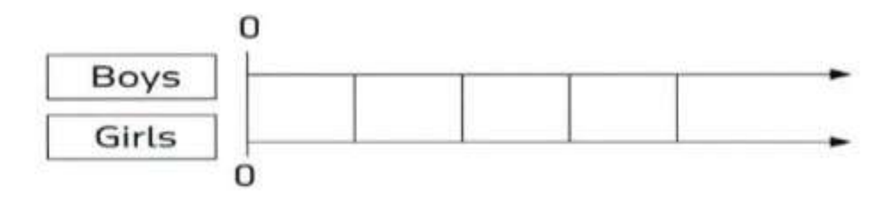


8) use the double number line to solve:

a) if the ratio between Omar saved to what Eman saved was 3 : 4. If Eman saved 20L.E , then Omar saved ………….. L.E.

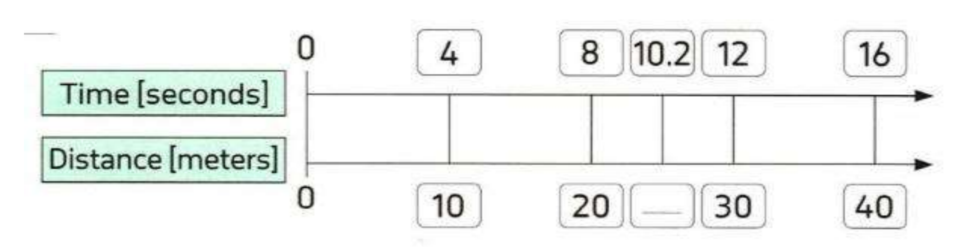


b) if the ratio between the number of boys to girls is 5 : 6 and the total number of boys and girls is 44 pupils, then the number of girls is …………



choose the correct answer:

1) the missing number in the opposite double number line



a) 20 b) 25 c) 30 d) 25.5

2) there are 24 cookies in 6 boxes, then the number of cookies in 3 boxes is ………………………



a) 4 b) 8 c) 12 d) 16

FUTURES EDUCATIONAL SYSTEMS

H.W

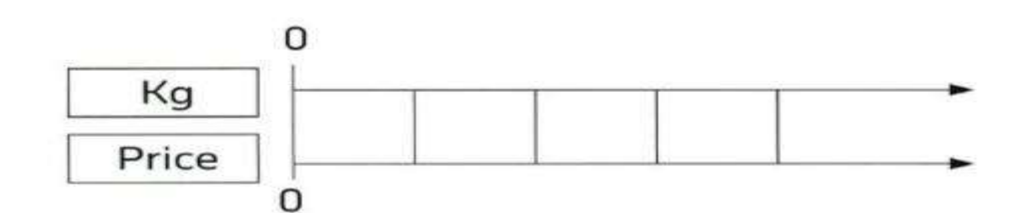
1) if the ratio between the price of one kg. of apples and oranges is 2 : 3 and the total price of apples and oranges is 20L.E . represent by tape diagrams and find the value of each block .

……………………………………………………………………………………………………
……………………………………………………………………………………………………

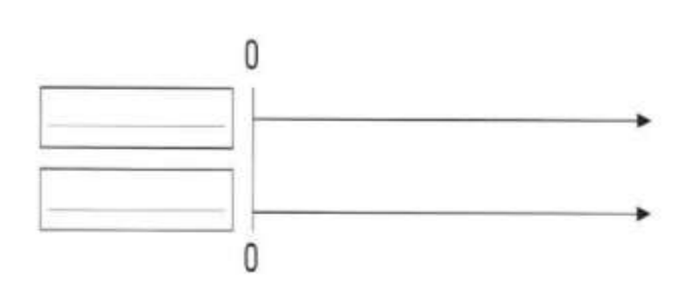
2) if the ratio between Ahmed saved and what his sister Sarah saved is 9 : 4 and what Ahmed saved was 81 L.E, find what Sarah saved by using tape diagrams.

……………………………………………………………………………………………………
……………………………………………………………………………………………………

3) if the price one kilogram of orange is 15L.E, then the price pf 4 kg is………

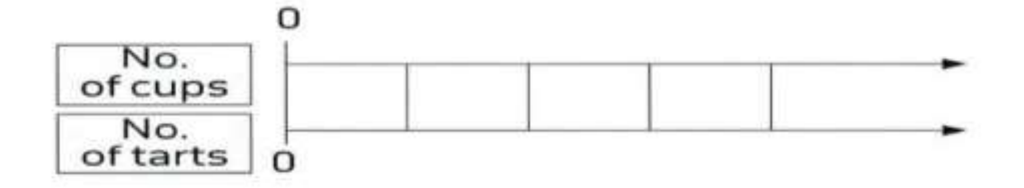


4) represent the opposite table by double number line



Time in sec.	Distance in m.
1	4
2	8
3	12
4	16

5) sally used 2 cups of flour to make a tart, then she used 8 cups of flour to make ……………….. tarts.





LESSON 6 : COMPARING AND ANALYZING RATIOS

properties of equivalent ratios

property 1

if you multiply or divide each of two terms of a ratio by the same non-zero number, the resultant ratio is equivalent to the first ratio.

a. $\frac{2}{3} = \frac{4}{6}$ (× 2) and $\frac{2}{3} = \frac{10}{15}$ (× 5) then $\frac{2}{3}$, $\frac{4}{6}$, $\frac{10}{15}$ are equivalent ratios.

b. $\frac{15}{20} = \frac{3}{4}$ (÷ 5) and $\frac{15}{20} = \frac{30}{40}$ (× 2) then $\frac{15}{20}$, $\frac{3}{4}$, $\frac{30}{40}$ are equivalent ratios.

---

property 2

if $\frac{a}{b} = \frac{c}{d}$, (a and d are called extremes, b and c are called means)

then the product of extremes = the product of means

$$a \times d = b \times c$$

for example : $\frac{2}{3}$ *and* $\frac{4}{6}$ *are two equivalent ratios*

$\frac{2}{3} = \frac{4}{6}$ then $2 \times 6 = 3 \times 4$

$12 = 12$

- **This method is called multiplication and division.**



Exercise

1) show which of the following are equivalent or not equivalent by simplify

a) $\frac{5}{10}$, $\frac{4}{8}$

………………………………………..………………………………………………………..

b) $\frac{35}{25}$, $\frac{7}{5}$

………………………………..……………………………………………………………...

C) $\frac{8}{10}$, $\frac{12}{14}$

…………………………………………………………………………………………………..

d) $\frac{5}{10}$, $\frac{10}{15}$

…………………………………………………………………………………………………...

e) $\frac{7}{21}$, $\frac{1}{3}$

…………………………………………………………………………………………………...

f) $\frac{6}{15}$, $\frac{4}{18}$

……………………………………………………………………………………………………

2) Show which of the following are equivalent or not equivalent by multiplication and division:

a) $\frac{6}{5}$, $\frac{10}{12}$

…………………………………………………………………………………………………...

b) $\frac{18}{28}$, $\frac{8}{14}$

……………………………………………………………………………………………………

c) $\frac{2}{8}$, $\frac{1}{4}$

…………………………………………………………………………………………………...



d) $\frac{8}{6}$, $\frac{12}{9}$

……………………………………………………………………………………………..

e) $\frac{23}{46}$, $\frac{2}{6}$

……………………………………………………………………………………………..

f) $\frac{7}{21}$, $\frac{1}{3}$

……………………………………………………………………………………………..

3) show which of the following are equivalent :

a) $\frac{1}{10}$, $\frac{3}{30}$, $\frac{2}{20}$

……
……

b) $\frac{1}{4}$, $\frac{4}{8}$, $\frac{5}{50}$

……
……..

C) $\frac{1}{7}$, $\frac{2}{14}$, $\frac{3}{21}$

……
………………………………………………………………………………………………………...

d) $\frac{9}{15}$, $\frac{15}{25}$, $\frac{3}{5}$

……
……..

e) which of the following are equal to 3 : 4 ?

a) 5 : 6 b) 15 : 20 c) 10 : 20 d) 6 : 10



4) Find the missing value :

a) $\frac{3}{4} = \frac{x}{12}$

……………………………………………………………………………………………………

……………………………………………………………………………………………………

b) $\frac{5}{8} = \frac{10}{b}$

……………………………………………………………………………………………………

……………………………………………………………………………………………………

c) $\frac{8}{12} = \frac{x}{6}$

……………………………………………………………………………………………………

……………………………………………………………………………………………………

d) $\frac{2}{7} = \frac{6}{d}$

……………………………………………………………………………………………………

……………………………………………………………………………………………………

e) $\frac{m}{20} = \frac{7}{4}$

……………………………………………………………………………………………………

……………………………………………………………………………………………………

f) $\frac{7}{t} = \frac{14}{20}$

……………………………………………………………………………………………………

……………………………………………………………………………………………………

5) comparing ratios. Tarek and Hesham each made a batch of paint in the paint mixer. Hesham's batch was in the ratio 6 yellow to 4 red. Tarek wants to have the same color as Hesham, so he used a ratio 9 yellow to 6 red. Are their paint batches the same color?

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………



Unite 10 UNIT RATE AND PERCENT

Lesson 1: Exploring Unit Rate

Lesson 2 : Determining Unit Rate

Lesson 3 :Using the Unit Rate

Unite rate: it is a rate that compares the number of units of one quantity with one unit of the second quantity.

Example of rate

Unite rate	Not a unite rate
Car speed : 80 kilometers per hour	Car speed : 320 kilometers in 4 hour
Sugar price : 45 pounds per kilogram	Sugar price : 135 pounds per3 kilogram
Number of playing cards : 7 cards for each player	Number of playing cards :35 cards for every 5 player
Number of football players: 11 players in each team	Number of football players: 66 players in 6 teams

Determining Unite Rate

who is fastest ?

3 Runners are practicing in the track , their trainner recorded covered distance

and taken time for each runner In the opposite table.

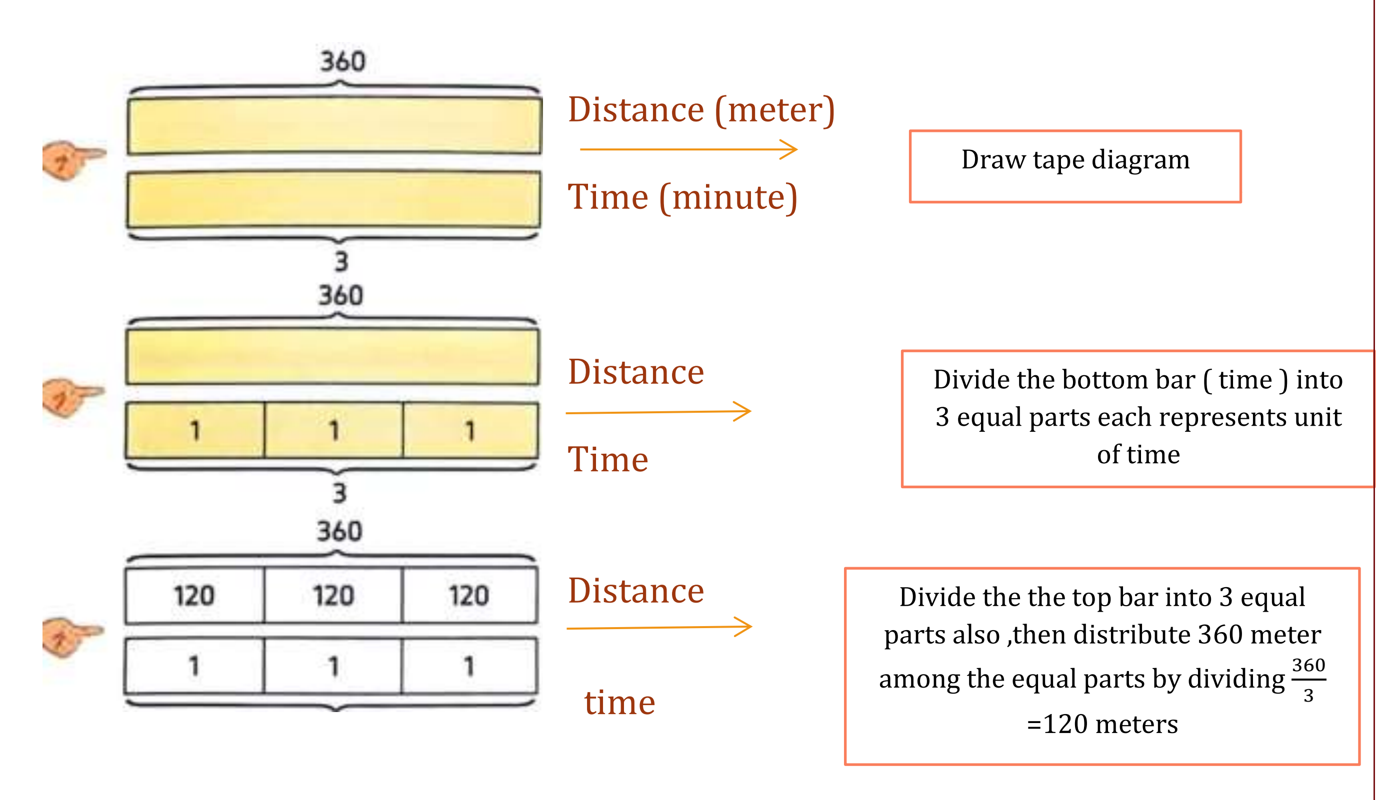
Runner	Distance	Time
Youssef	360meters	3 minutes
Tony	500meters	4 minutes
malek	590meters	5 minutes

The table shows three different rates cannot tell us who is the fastest ?

So we have to find the unit rate for each runner to determine who is the fastest .

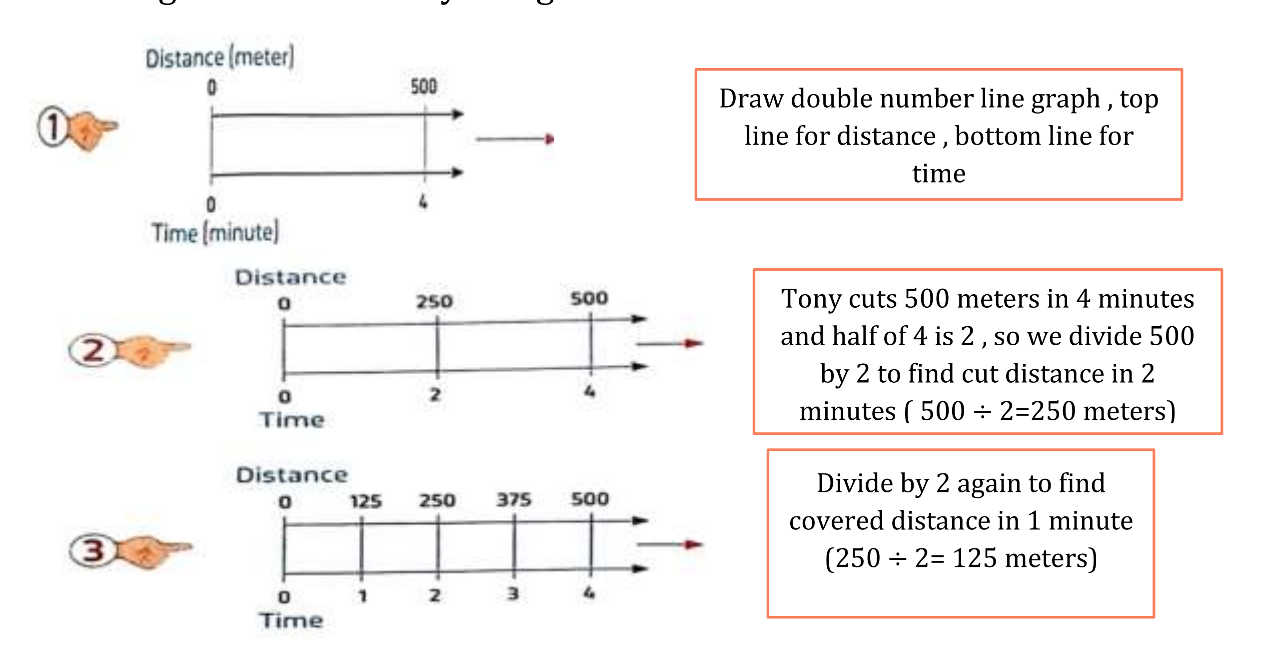
Unite rate can be found using three methods so we will use one of them for each runner .

1- Finding unit rate of youssef using tape diagram :



The unit rate of youssef 120 meters per unite .

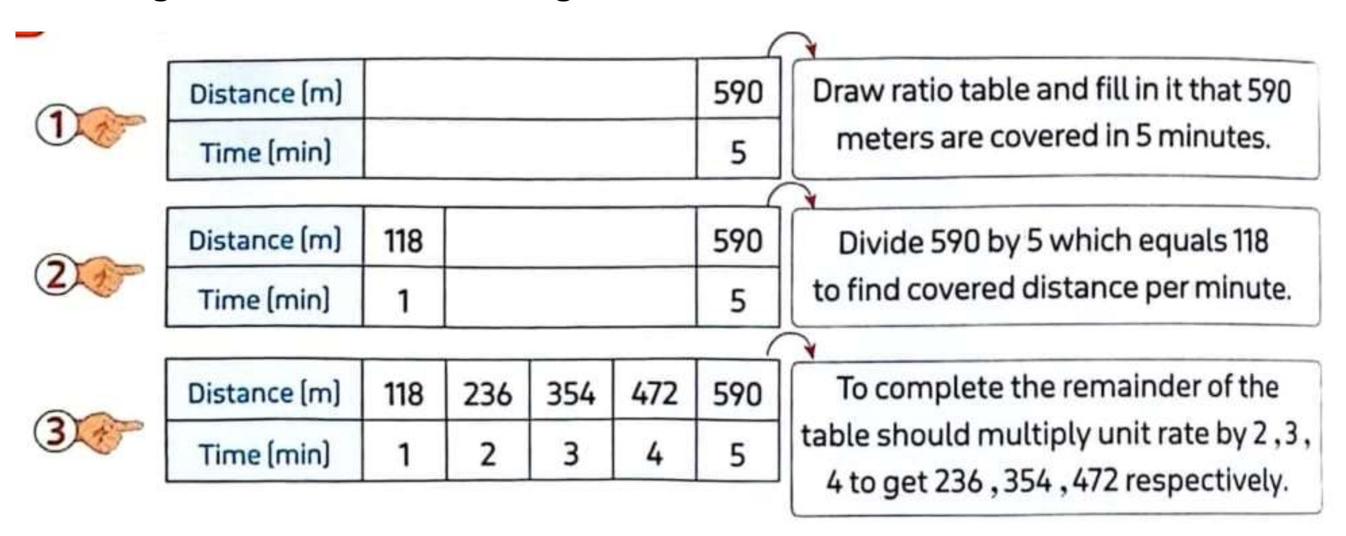
2-finding unite rate of tony using double number line :





The unit rate of tony is 125 meters per minute

3- finding unite rate of malek using ratio table :



①

Distance (m)		590
Time (min)		5

Draw ratio table and fill in it that 590 meters are covered in 5 minutes.

②

Distance (m)	118		590
Time (min)	1		5

Divide 590 by 5 which equals 118 to find covered distance per minute.

③

Distance (m)	118	236	354	472	590
Time (min)	1	2	3	4	5

To complete the remainder of the table should multiply unit rate by 2 , 3 , 4 to get 236 , 354 , 472 respectively.

The unite rate of malek is 118 meters per minute .

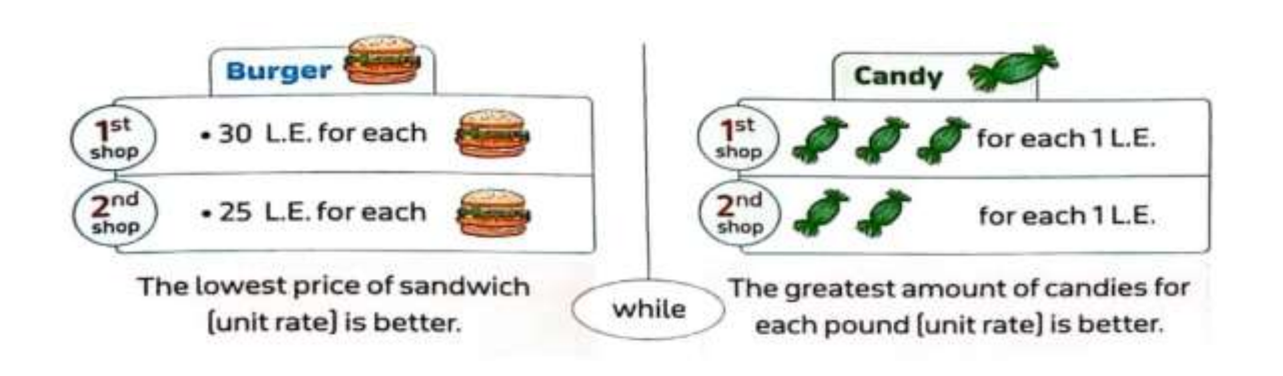
Finally

From 1,2,3 when all of the rates are expressed as unite rates , acomparison can be made for coverd distance for 1 minute for the three runners , then tony rate of 125 meters per minutes is greater than the other two runners .tony is the fastest .

Using the unit rate

some of us think that the greater unit rate is better than the smaller one but that not necessary true

for example : to by something from two different shops .

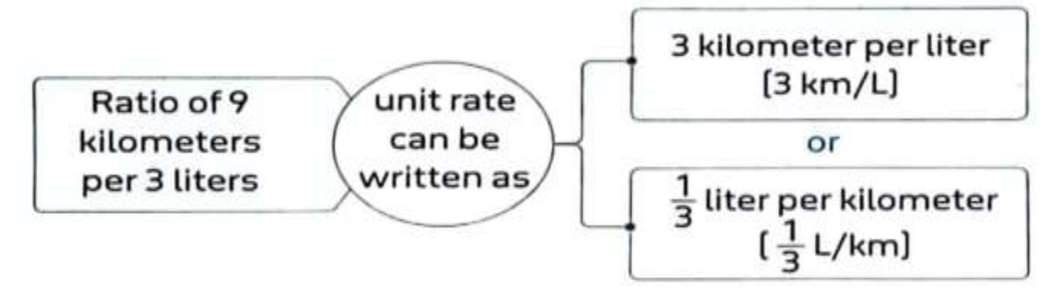




Notice that

Unit rates can be written in two different forms

For example :



Write (unite rate –not unite rate) for each of the following .

a -9 kilometers per hour. (............)

b- 30 tea spoons of butter for 5 loaves of bread. (............)

c- 42 cards for 6 players. (............)

d - 36 kilometers in 4 hours. (............)

e - 50 gram of peanuts for every 1 gram of walnuts. (............)

f -7 cards for each player . (............)

g – 6 tea spoons of butter for 1 loaf of bread. (............)

h-26 books for 2 students . (............)

i-15 pound daily . (............)

j- 5000 pounds per month . (............)

Complete to get (unite rate – not unite rate) as shown between brackets .

a- 36 gm. of sugar for ....cup. (not unite rate)
b- 3 sandwiches for ....child. (unite rate)
c- ....kilometers for ....hour. (not unite rate)
d- 4tickets for ....game. . (unite rate)

FUTURES EDUCATIONAL SYSTEMS

Use the opposite tape diagram to find the unit rate,then complete :

a-32 L.E notebooks , then ……………..L.E. for each note book .

b- 18 liters in 6 bottles ,then ……………….liters in each bottles.

c-9 oranges in 3 kilograms ,then …………….oranges in each kilogram .

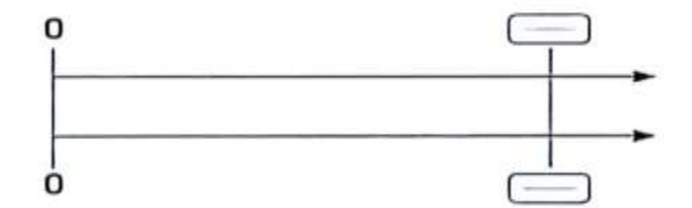
d-350 kilometers in hours , then ………..kilometers in each hour .

e-420 L.E.weekly , then …………L.E daily .

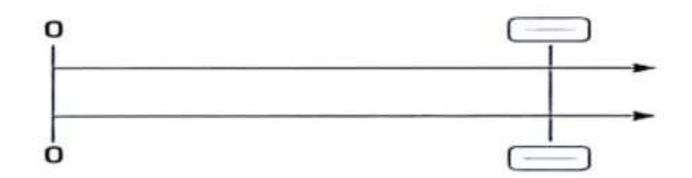
Use the double number line to find the unite rate ,then complete .

a-12 pupils in 4 benches , then …………pupils in each bench.

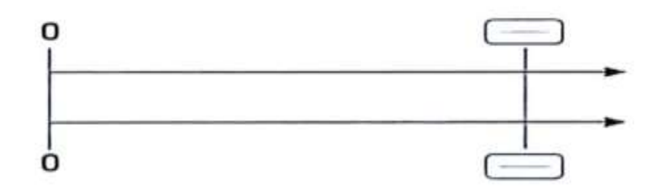




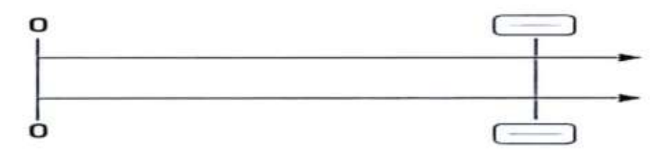
b- 200L.E for 4 shirts , then……………L.E for each shirt .



c-24 kg of cheese for 8 boxes , then …………kg for each box .



d-450km in 3hours , then …………….km per hour .



<u>Use ratio table to find the rate , then complete .</u>

a- 180L.E in 3 day ,then ……….L.E per day .

L.E			
Day			

b-636 pupils in 6 stage, then ………. Pupils in each stage .

pupils			
stage			

c-150 passengers in 5 buses , then………..passengers per bus .

passanger			
bus			



CONVERT MEASUREMENT WITH RATIOS

Lesson Four : Exploring conversion Factor

Lesson Five : Using Conversion Factor

Lesson Six : Application conversion Factor

Some units of measurement :

●Length units: 1 Km = 1000 m   1 m = 100 cm

1 dm = 10 cm   1 cm = 10 mm

●Mass units: 1 ton = 1000 Kg   1 Kg = 1000 gm

● Capacity units: 1 liter = 1000 milliliters

●Time units: 1year =12 months   1 week = 7days   1day=24hours

1 minute=60seconds   1 hour = 3600 seconds

Conversion factor:

●Is a ratio between two equal amounts one of them is 1 expressed in different units the same measurement system.

For example: $\frac{10mm}{1cm}$ $\frac{1day}{24\ hour}$ 1 minute = 60seconds

60 minute: 1 hour   1 week: 7 days

● Conversion factor can be written as unit rate in two ways.

7 days/ week   or $\frac{1}{7}$ week / day



Comparison between (conversion factor / unit rate)

Conversion factor	Unit rate
● Describe ratio using a 1 ● 1 can show a measurement for neither quantity ● Defines an equivalence between different units of measure for the same quantity	● Describe ratio using a 1 ●1 must be the second quantity per1 ● compares two different quantities.

1. Which of the following statements are true? Select all that apply.

a. There are 10 millimeters per centimeter.

b. The ratio of millimeters to centimeters is 1 : 10

c. For every 1 cm . There are 10 mm.

d. The equivalency between measures can be written as 10 cm = 1 mm

e. For every 10 mm .there is 1 cm

f. The ratio of millimeters to centimeters is 10 to 1



2. **Write (conversion factor / not conversion) between brackets:**

a. 100m = 1km (………………)

b. 3m = 4m (………………)

c. $\frac{60\ min}{1hr}$ (………………)

d. $\frac{1000\ mm}{1kg}$ (………………)

e. $\frac{90km}{1hr}$ (………………)

f. $\frac{2cm}{5m}$ (………………)

g. 1day:24hr (…………………)

h. $\frac{1m}{1000\ mm}$ (………………)

i. $\frac{1m}{100cm}$ (………………)

j. 1000ml : 1L (…………………)

k. 1liter= 1000 mm (………………)

l. $\frac{20\ min}{1m}$ (…………………)

3. **Complete using an appropriate conversion factor**.

a. 25kg x $\frac{\quad\quad gm}{\quad kg}$ = ………… gm

b. 250cm x $\frac{\quad\quad m}{\quad cm}$ = ………… m

c. 3.72km x $\frac{\quad\quad m}{\quad km}$ = ………… m

d. 2.5hr x $\frac{\quad\quad min}{\quad hr}$ = ………… min

e. 5hr x $\frac{\quad\quad min}{\quad hr}$ = ………… min

f. 80,000mL x $\frac{\quad\quad L}{\quad mL}$ = ………… L

g ……… m x $\frac{\quad\quad km}{\quad m}$ = 0.07 km

h. ………. min x $\frac{\quad\quad hr}{\quad min}$ = 60 hr



4. convert each of the following speeds.

a. $\frac{25km}{1hr}$ x $\frac{\dots\dots\dots}{\dots\dots\dots}$ = $\frac{\dots\dots\dots m}{\dots\dots\dots hr}$

b. $\frac{3m}{1sec}$ x $\frac{\dots\dots\dots}{\dots\dots\dots}$ x $\frac{\dots\dots\dots}{\dots\dots\dots}$ = $\frac{\dots\dots\dots km}{\dots\dots\dots hr}$

c. $\frac{60m}{1min}$ x $\frac{\dots\dots\dots}{\dots\dots\dots}$ = $\frac{\dots\dots\dots m}{\dots\dots\dots sec}$

d. $\frac{120km}{1hr}$ x $\frac{\dots\dots\dots}{\dots\dots\dots}$ x $\frac{\dots\dots\dots}{\dots\dots\dots}$ = $\frac{\dots\dots\dots m}{\dots\dots\dots min}$

e. $\frac{135{,}000m}{1hr}$ x $\frac{\dots\dots\dots}{\dots\dots\dots}$ = $\frac{\dots\dots\dots km}{\dots\dots\dots hr}$

f. $\frac{76500m}{1min}$ x $\frac{\dots\dots\dots}{\dots\dots\dots}$ x $\frac{\dots\dots\dots}{\dots\dots\dots}$ = $\frac{\dots\dots km}{\dots\dots hr}$

5. Which is the Fastest Animal? Many animals can travel faster than you might think the typical top speeds of four animals are given here.

Animal	Speed
Black Mamba	5.6 meters per second
coyote	69 kilometers per hour
Roadrunner	889 centimeters per second
Great white shark	0.93 kilometers per minute

Convert each speed to kilometers per hour. Showing conversion. Then, order the animals by speed from fastest.

Slowest			Fastest



6. **Complete:**

a. Height of a house 12.7m, then its height in cm = ……………

b. A jar of capacity 5368 ml, then its capacity in L is …………..

c. The time of a session is 1.5 hr, then this time in minutes =……………..

d. The mass of a boy is 56700gm, then its mass in kg = ……………..

7. **Order the following speeds from slowest to fastest.**

a. 6.3m per sec

b. 48km per hr

c. 500m per min

d. 595 cm per sec

8. **Answer the following:**

a) Height of the great pyramid is approximately 14,600 centimeters

About how many meters tall is the Great pyramid?



b) Each stone block in the great pyramid has a mass of about 2,300 kilograms.

About how much is the mass of one block in grams? Show your calculations





c) On most summer days, camels drink about 20,000 milliliters of water. How many liters of water is that?

Show your calculations.



d) Suppose a particular caracal weight 30.5 kilograms how many grams does the caracal weight?



Choose the correct answer.

1) Which of the following is a conversion factor?

a. $\frac{3km}{1hr}$ b. $\frac{60min}{1sec}$ c. $\frac{7\ days}{1\ week}$ d. $\frac{1km}{1000cm}$

2) Which of the following is Not a conversion factor?

a. 1hr = 3600sec b. 12month:1year c. 1000mm=1liter d. $\frac{1min}{60sec}$

3) $\frac{1\ km}{\dots\dots\dots}$ is a conversion factor?

a. 1hr b. 1000m c. 100m d. 10,000 mm



4) $\frac{60km}{1hr}$ x $\frac{\dots\dots\dots}{\dots\dots\dots}$ = $\frac{60,000m}{1hr}$

a. $\frac{1km}{1000m}$ b. $\frac{1000km}{1m}$ c. $\frac{1m}{1000km}$ d. $\frac{1000m}{1km}$

5) 120m per min = ……………….. cm per sec

a. 12000 b. 200 c. 720 d. 1200

6) 3.6L x ……….. = 3600mL

a. $\frac{1000\text{L}}{1\text{ mL}}$ b. $\frac{100\text{mL}}{1\text{L}}$ c. $\frac{1000\text{mL}}{1\text{L}}$ d. $\frac{1\text{L}}{1000\text{mL}}$

7) $2\frac{1}{4}$ day = ………….. hr

a. 54 b. 48 c. 2400 d. 24

8) 360 sec = ………….. hr

a. 60 b. 10 c. 3600 d. 0.1

9) Which of the following is the greatest speed?

a. 70km per hr b. 1200m per min c. 25m per sec d. 81000 m per hr

10) The conversion factor to convert the speed from per min to km per hr is ………………..

a. $\frac{60\text{min}}{1\text{hr}}$ b. $\frac{1\text{km}}{1000m}$ c. $\frac{1\text{hr}}{60\text{min}}$ x $\frac{1\text{km}}{1000\text{m}}$ d. $\frac{1\text{km}}{1000\text{m}}$ x $\frac{60\text{min}}{1\text{hr}}$



UNIT 10

CONCEPT 3: UNDERSTAND PERCENT

Lesson seven: Exploring Percent

- **A percent is a ratio its second term is 100 (per hundred – hundredths)**

$\frac{40}{100}$	=	**40 %**	=	**0.40**
Fraction		**Percent**		**Decimal**

- **100% = $\frac{100}{100}$ = 1 (100% of a quantity denotes the whole (all) quantity)**

  50% = $\frac{50}{100}$ = $\frac{1}{2}$ (50 % of a quantity denotes half of the quantity)

  25% = $\frac{25}{100}$ = $\frac{1}{4}$ (25 % of a quantity quarter of this quantity)

1) Use (Greater than – Less than – Exactly)

a) If 65 percent of glass is full, then ……………………. half of glass is full.

b) If 20 percent of glass is full, then ……………………. half of glass is full.

c) If 80 percent of glass is full, then ……………………. half of glass is full.

d) If 50 percent of glass is full, then ……………………. half of glass is full.

e) If 35 percent of glass is full, then ……………………. half of glass is full.

2) Write each percent as a fraction in the simplest form.

70% 140% 4% 18.5%

3) Write each percent as decimal.

18% 120% 9% $2\frac{3}{4}$%

4) Write each decimal as percent.

0.63 0.06 0.8 1.24

5) Write each fraction as percent.

$\frac{2}{5}$ $\frac{3}{4}$ $\frac{7}{25}$ $\frac{9}{20}$



6) **Complete the table.**

Fraction	Equivalent fraction with a denominator of 100	Percent	Decimal
$\frac{1}{4}$			
$\frac{1}{2}$			
$\frac{7}{10}$			
$\frac{2}{5}$			
$\frac{3}{20}$			
	$\frac{10}{100}$		
	$\frac{40}{100}$		
		45%	
			0.01
			0.75





7) Complete:

Percent	Decimal	Fraction
35%		
110%		
33%		
100%		
		$\frac{27}{100}$
		$\frac{6}{25}$
		$\frac{2}{100}$
	0.15	
	0.09	
	0.40	
10.5 %		
$\frac{2}{25}$ %		
$3\frac{1}{5}$ %		
$5\frac{1}{4}$ %		



8) Complete each of the following :

a) If 8 % of the students are absent ,then ……………. Of them are present.

b) If the percentage of success at school is 76% ,the percentage of failure is…. %

c) 1 – (15 % + 55 %) = …………… %

d) 28% + 52% + …………… = 1

e) 99% – (22 % + 43 %) = $\frac{\dots\dots\dots}{\dots\dots\dots}$

f) $1 - \frac{3}{4}$ = ………………………… %

g) 15% – 0.15 =……………………

h) $\frac{3}{7} X \frac{7}{3}$ = ……………… %

i) 12% ÷ 4% = ……………..

j) If $\frac{X}{9}$ = 15 % ,then X = ………………..

k) If $\frac{X}{12}$ = 36 % ,then X = ………………..





Lesson Eight : Finding The Part, The Whole And The Percent
Lesson Nine: Using Models To Find The Whole
Lesson Ten: Using Models To Find Percentage

1) **Some analysts estimate that up to 75 % of students wear eyeglasses. In a lecture hall, 50 college are wearing eyeglasses. About how many students are in the hall?**

Whole	Part	Percent

2) **A travel agent blocked 1,500 historic tours of Egypt. Of these tours,60% were to the pyramids of Giza. How many tours did the agent book for the pyramids of Giza?**

Whole	Part	Percent

3) **Ezz paid 200 LE for a pair of jeans on sale. The original price of the pair of jeans was 600 LE. What percent of the price did Ezz pay?**

Whole	Part	Percent



4) Write the description from the given options that is represented by each percent problem.

Finding the Percent | Finding the Part | Finding the Whole

a) 10% of the students in a class are wearing red. There are 30 students in the class. How many are wearing red ?

b) Five out of 10 pieces of banana were eaten. What percent in of banana was eaten?

c) Of the students in a school,300 have pets. If 30% of all students have pets, how many students are there in the school?

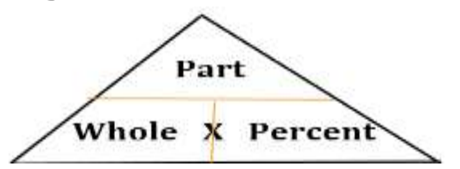
d) If 37% of the people in Egypt were under 18. Suppose 700 people lived in an Egyptian neighborhood. How many were most likely under 18?

e) If 40% of people that were surveyed like wresting and there were 80 surveys that favored wresting. How many people were surveyed?



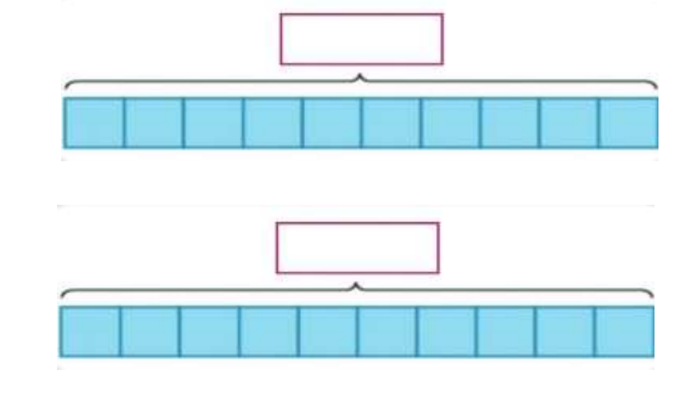


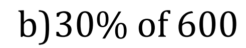
<u>Multiplication algorithm</u> **The part = Whole X Percent**



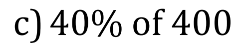
5) Answer the following questions.

a) 60% of 70

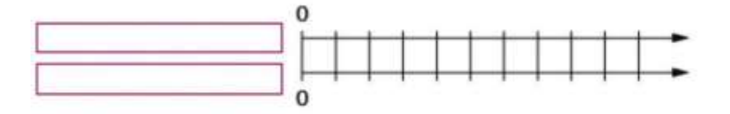


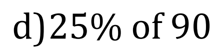


b) 30% of 600

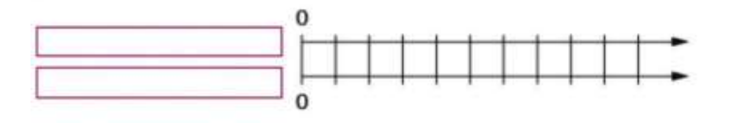


c) 40% of 400

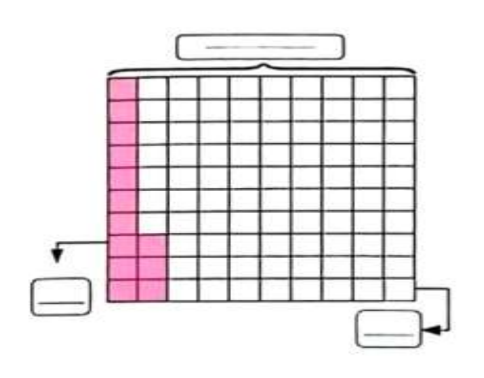




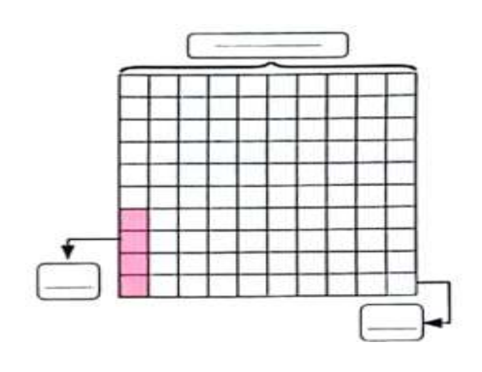
d) 25% of 90



e) 13% of 300



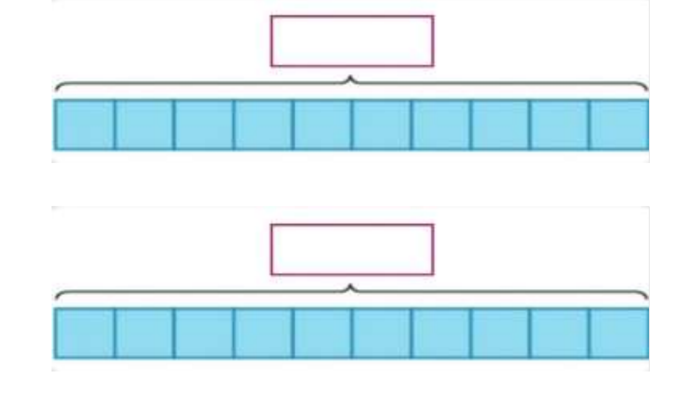
f) 4% of 200





6) Find the Value of the unknown number.

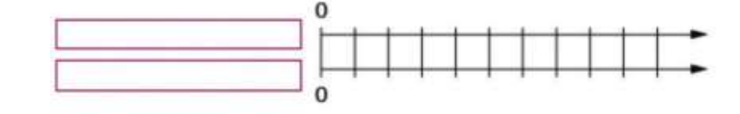
a) 20% of a number is 16.



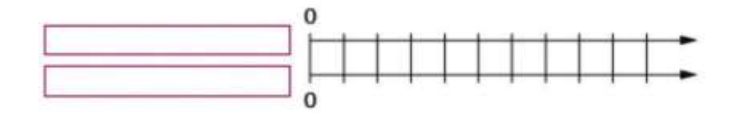


b) 40% of a number is 140.

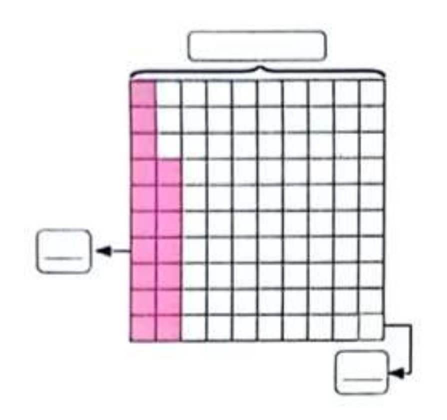
c) 50% of a number is 45.

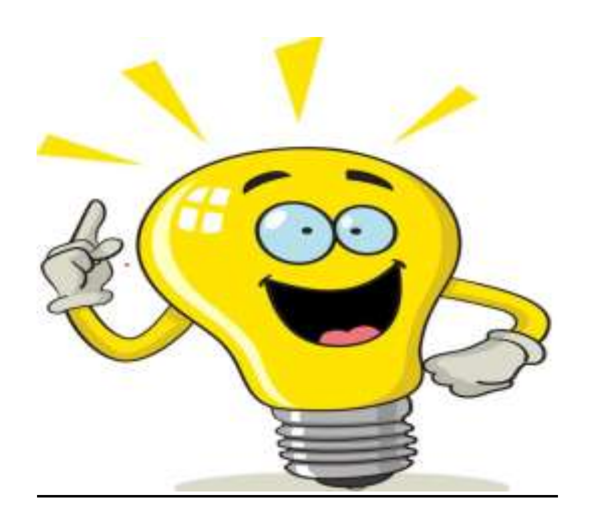


d) 25% of a number is 125.



e) 17% of a number is 68.

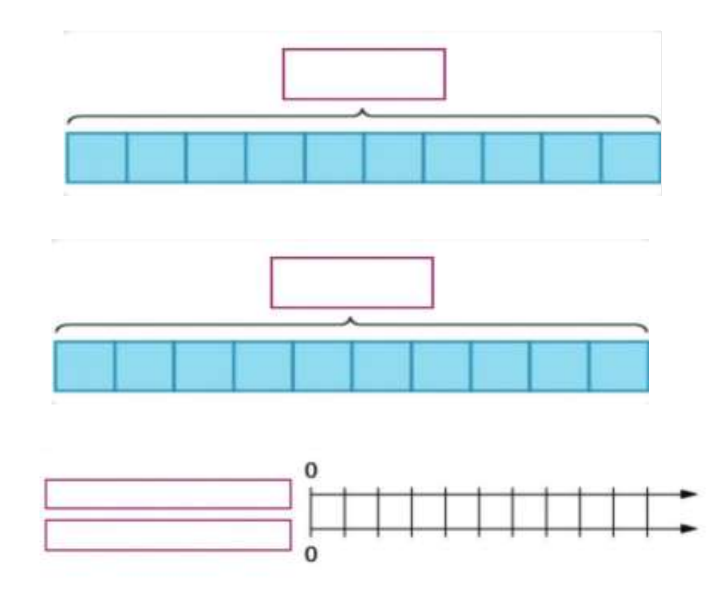






7) Find the percent

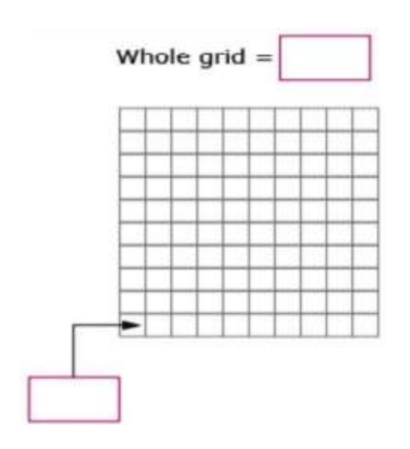
a) 35 out of 50



b) 15 out of 75

c) 24 out of 80

d) 135 out of 900



8) Complete

a) 23% of 300 = …………..

b) 45 % of 200 = …………….

c) ………… %of 600 = 120

d) ………… %of 240 = 60

e) 25 %of a number is 120 ,then this number is ……………

f) 30 % of 50 = ………….



Lesson11: Applications on percentage

1) **Complete**

Original price	5 % of the price	10 % of the price	20 % of the price	30 % of the price
30 LE				
45 LE				
23 LE				
124 LE				
6000 LE				
50 LE				
140 LE				
36 LE				
4500 LE				
320 LE				
700 LE				

2) **Complete**

A. Determine 10 % for each of the given values in column one and three.

Original Price	10% of the Price	Original Price	10% of the Price
50 LE	________ LE	42 LE	________ LE
140 LE	________ LE	320 LE	________ LE
9 LE	________ LE	5.3 LE	________ LE

B. Now, use the values you found for 10 % to find these percents.

What is 20% of 42 LE?	________ LE
What is 30% of 320 LE?	________ LE



3) Complete

A. Determine 10 % for each of the given values in column one and three.

Original Price	10% of the Price	Original Price	10% of the Price
50 LE	________ LE	42 LE	________ LE
140 LE	________ LE	320 LE	________ LE
9 LE	________ LE	5.3 LE	________ LE

B. Now, use the values you found for 10 % to find these percents.

What is 20% of 42 LE?	________ LE
What is 30% of 320 LE?	________ LE

4) Compute the sale price of the item after applying the discount.

Item and Price	Percent Off	Savings	Sale Price
Shoes: 1,400 LE	20%	________ LE	________ LE
T-shirt: 900 LE	30%	________ LE	________ LE
Jeans: 500 LE	40%	________ LE	________ LE

5) Use 1% and 10% to find each of the following.

a) 12% of 600

b) 15% of 320

c) 35% of 170

d) 10.5 of 900

e) 41% of 25



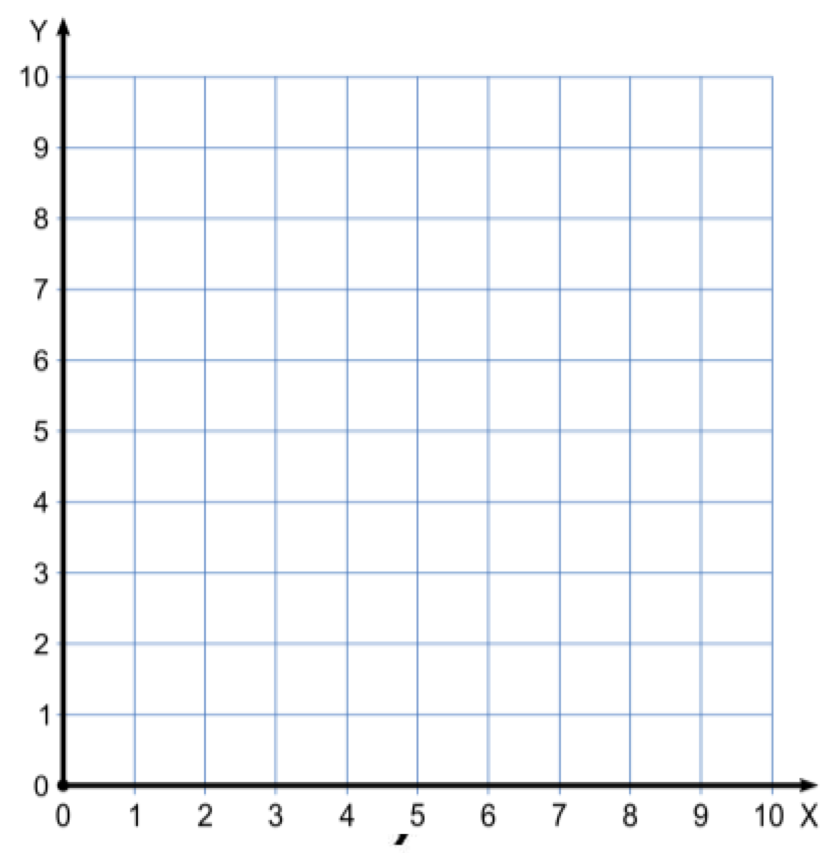
UNIT 11

Lesson 1: Exploring The Coordinate Plane

Plot each point on the coordinate plane



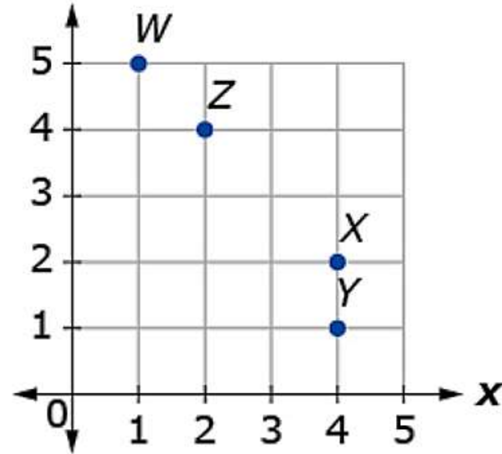
1. F (4 , 3)
2. H (7 , 7)
3. L (3 , 8)
4. M (2 , 10)
5. A (6 , 1)
6. S (4 , 0)
7. W (1 , 9)
8. T (4 , 8)
9. D (0 , 10)
10. R (10 , 10)



A student plots the following points:

- Point W (1 , 5)
- Point Z (2 , 4)
- Point X (4 , 3)
- Point Y (4 , 1)

Which point was not plotted correctly?

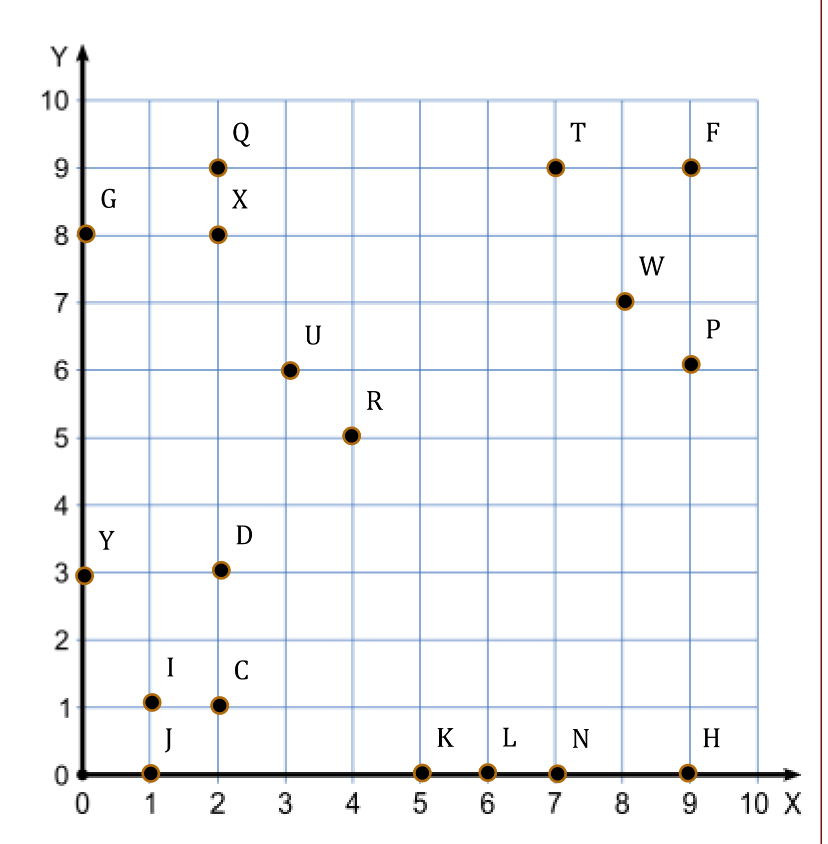


In the following coordinate plane, observe and answer.



1. *What is the name of each of the following points?*

1. (9 , 0)
2. (4 , 5)
3. (1 , 0)
4. (6 , 0)
5. (0 , 8)
6. (0 , 0)
7. (2 , 9)
8. (7 , 9)
9. (2 , 3)
10. (9 , 6)



2. *Write the order pair of each of the following points*

1. K ....

2. F ....

3. W ....

4. Y ....

5. C ....

6. U ....

7. N ....

8. X ....

9. I ....

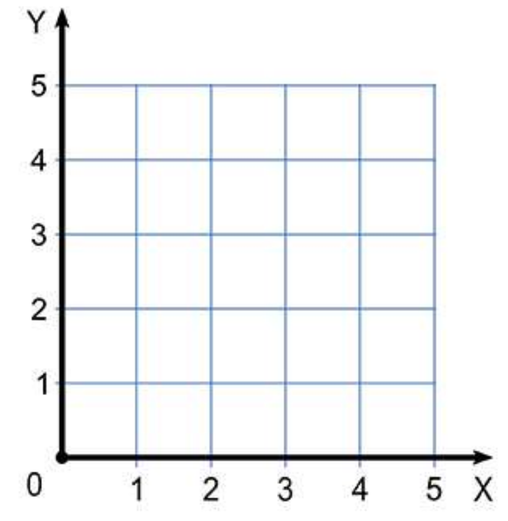
10. D ....



The points below will create a letter,

Draw and join them on the coordinate plane to find out the letter.

(3 , 1) , (3 , 3) , (2 , 3) , (4 , 3)



Identify which statement are true

1. The larger the value of the x-coordinate, the closer the point to the origin
2. The smaller the value of the y-coordinate, the closer the point to the x-axis
3. The smaller the value of the x-coordinate, the closer the point to the y-axis
4. Making the values of the x and y-coordinate larger moves the point farther away from the origin
5. To move a point 2 spaces up and 1 space to the right, increase the y-coordinate by 2 and the x-coordinate by 1
6. To move a point 2 spaces up and 1 space to the right, increase the x-coordinate by 2 and the y-coordinate by 1



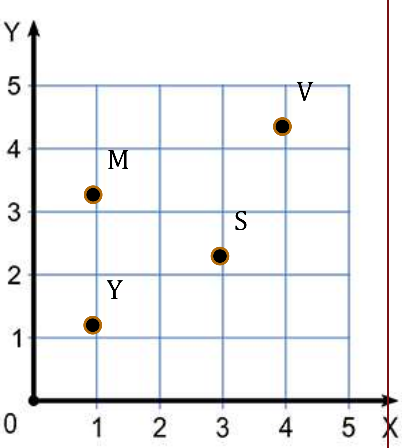
Choose the correct answer

1. The point W is located 6 spaces to the right and 3 spaces up from the origin. What order pair represent the point W?

   a) (6 , 0) b) (3 , 3) c) (6 , 3) d) (3 , 6)

2. Noha has decided to start drawing from the point on the coordinate plane that is represented by the ordered pair (3 , 2)

   What point is located at (3 , 2) on the coordinate plane ?



   a) S  b) M c) Y  d) V

3. If P (5 , 1) , Q (8 , 0) , R (0 , 4) , S (0 , 5) , O (0 , 0) are plotted on the coordinate plane , then the points on the x-axis is/are …………..

   a) P and R b) R and S c) only Q d) Q and O

4. Tamer plotted a point on the coordinate plane to represent the ordered pair (3 , 8). Which is true statement is true?

   a) The point is located 8 spaces to the right of the y-axis
   b) The point is located 8 spaces up from the x-axis
   c) The point is located 3 spaces up from the x-axis
   d) The point is located 3 spaces below the x-axis

5. The coordinates of the origin are …………..

   a) (1 , 0) b) (0 , 1) c) (1 , 1) d) (0 , 0)



Lesson 2: Analyzing the coordinate plane

Locate the following points, then determine which quadrant or axis the points are in

E. (-2 , 1) ……………………………………. B. (1, 5) …………………………………….

C. (-5 , 0) ……………………………………. Q. (-4 , -3) …………………………………..

S (0 , 5) ……………………………………. F. (5 , 2) …………………………………….

G. (-3 , -6) ………………………………….. W. (-1 , 0) ……………………………………

Write the order pair that represent each of the following points



M. (……. , …….)

B. (……. , …….)

A. (……. , …….)

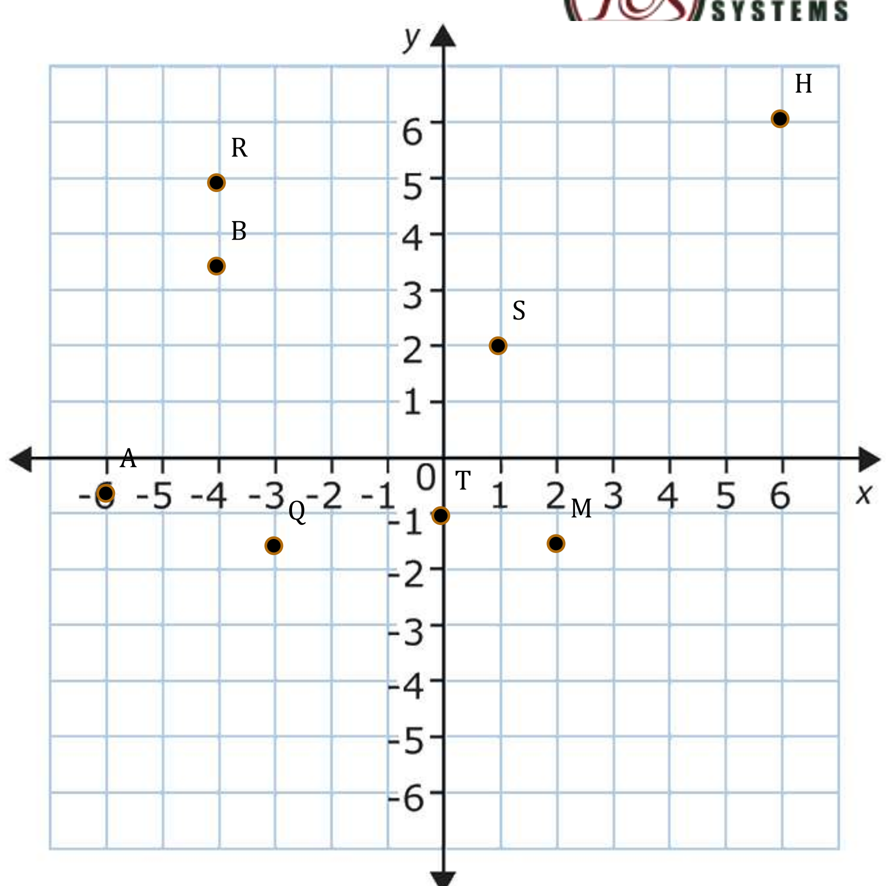
H. (……. , …….)

Q. (……. , …….)

R. (……. , …….)

T. (……. , …….)

S. (……. , …….)



Give the quadrant that the following points lie on

a) (2 , -7) ………………………………………….

b) (4 , 9) ………………………………………….

c) (-5 , -8) ………………………………………….

d) (0 , -1) ………………………………………….

e) (2 , 3) ………………………………………….

f) (-4 , -4) ………………………………………….

g) (-6 , 3) ………………………………………….

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Choose the correct answer

a. A point both of whose coordinates are negative will lie in ……………..

a) 1st quadrant b) 2nd quadrant c) 3rd quadrant d) 4th quadrant

b. If the y-coordinate of a point is zero, then this point always lies ……………

a) 1st quadrant b) 2nd quadrant c) on x-axis d) on y-axis

c. Point (2 , -4) lies in …………

a) 1st quadrant b) 2nd quadrant c) 3rd quadrant d) 4th quadrant

d. Point (0 , -6) lies …………

a) 2nd quadrant b) 4th quadrant c) on x-axis d) on y-axis

e. If the y-coordinate of a point is zero, then this point lies ……….

a) 3rd quadrant b) 4th quadrant c) on x-axis d) on y-axis

f. Which is true of all points in the second quadrant?

a) positive x-coordinate, positive y-coordinate

b) negative x-coordinate, negative y-coordinate

c) negative x-coordinate, positive y-coordinate

d) positive x-coordinate, negative y-coordinate

g. Which of the points P(0 , 3) , Q(1 , 0) , R(0 , -1) , S(-5 , 0) and T (1 , 2) don't lie on the x-axis?

a) P and R only b) Q and S c) P , R and T d)Q , S and T

h. The points (-5 , 2) and (2 , -5) lie in the ……………………

a) same quadrant b)2nd and 3rd quadrant respectively

c) 2nd and 4th quadrant respectively d) 4th and 2nd quadrant respectively

i. If the point A (-2 , 3) moves 2 units to the right then 3 units downward, then A will be …………

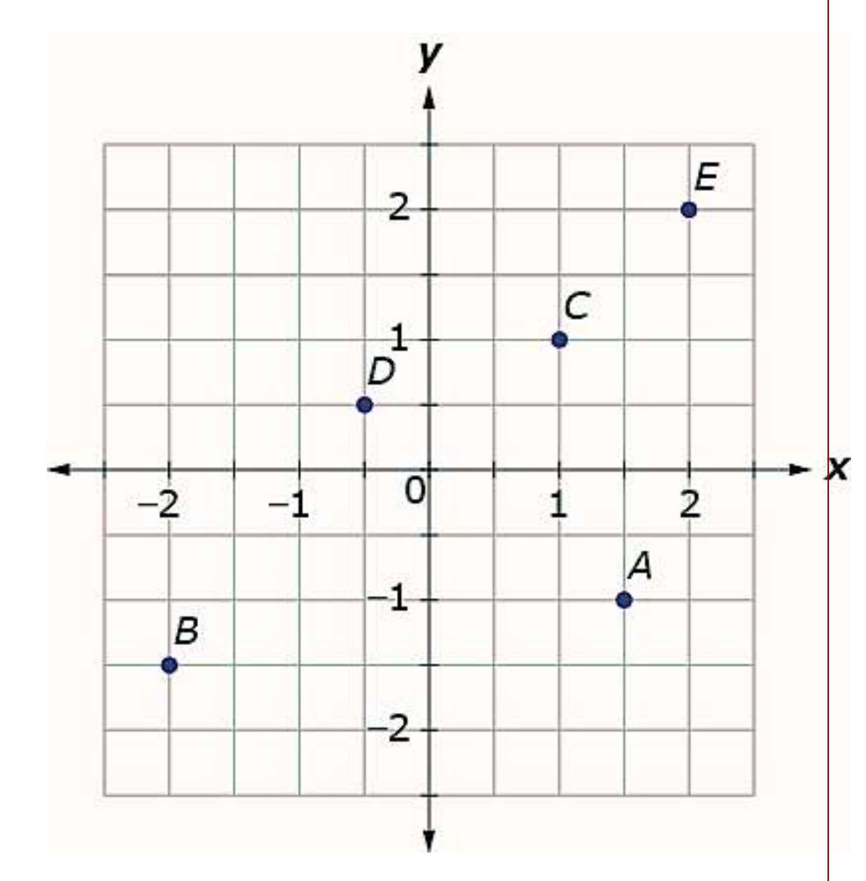
a) (-2 , 0) b) (0 , -1) c) (1 , 1) d) (0 , 0)



Lesson 3: Analyzing points on the coordinate plane

Write the ordered pair that corresponds to the points

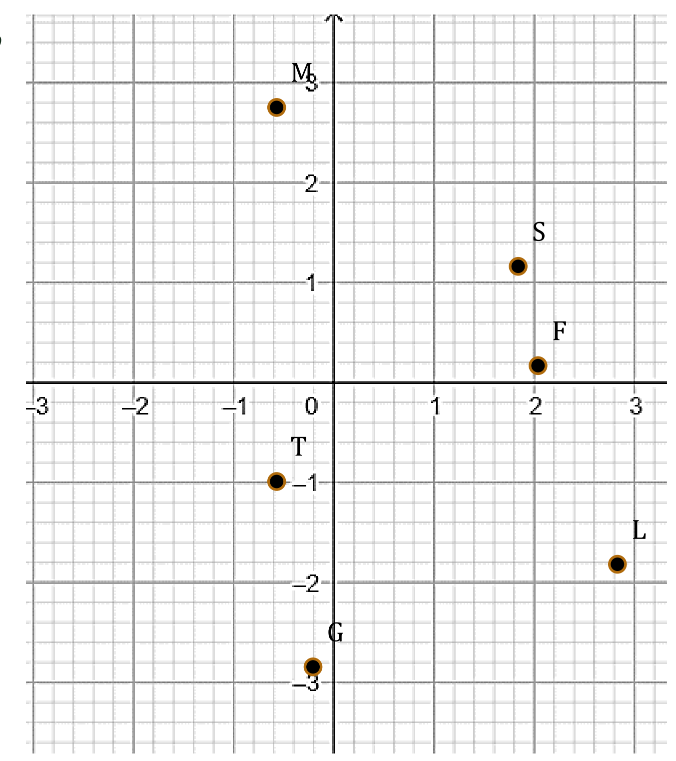
- A ………………………….
- B ………………………….
- C ………………………….
- D ………………………….
- E ………………………….



Write the ordered pair that corresponds to the points

- M ………………………….
- S ………………………….
- F ………………………….
- T ………………………….
- G ………………………….
- L ………………………….

Graph each point,



Then reflect the point in the x-axis. Record the coordinates of the image



- A (1 , 3)

Image :…………………...

- B (-2 , -2)

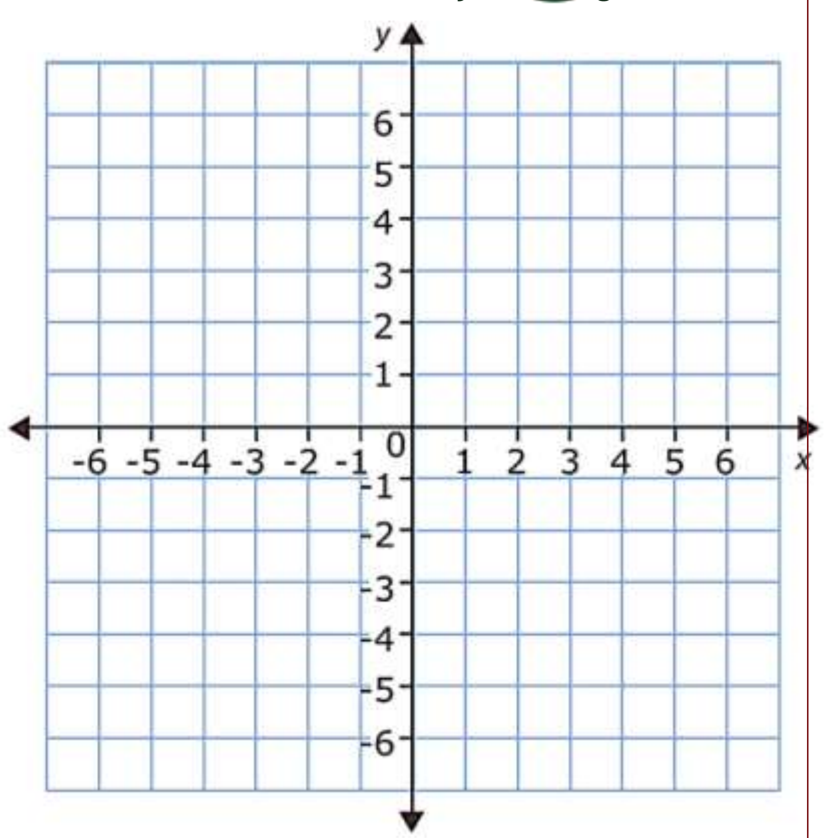
Image :…………………...

- C (-4 , 5)

Image :…………………...

- D (2 , -5)

Image :…………………...



Points M and N are images of each other by reflection across the x-axis.

Give the coordinates of point N if the coordinates of point M are

a. (8 , 1) …………………………………...

b. (6 , -4) …………………………………...

c. (-3 , 3) …………………………………...

d. (-6 , -2) …………………………………...

e. (4 , 7) …………………………………...

f. (-1 , 5) …………………………………...



Graph each point,

Then reflect the point in the y-axis. Record the coordinates of the image

- A (1 , 3)

Image :…………………...

- B (-2 , -2)

Image :…………………...

- C (-4 , 5)

Image :…………………...

- D (2 , -5)

Image :…………………...

Points J and K are images of each other by reflection across the y-axis.

Give the coordinates of point N if the coordinates of point M are

a. (8 , 1) …………………………………...

b. (6 , -4) …………………………………...

c. (-3 , 3) …………………………………...

d. (-6 , -2) …………………………………...

e. (4 , 7) …………………………………...

f. (-1 , 5) …………………………………..

Find the coordinates of each point moving by the given direction to get the end point

Start	Direction	End
a. (2 , 3)	5 units down and units left	
b. (-2 , -1)	3 units up and 3 units right	
c. (4 , -5)	6 units left and 7 units up	
d. (1 , 0)	4 units right and 2 units up	
e. (-5 , -5)	8 units right and 3 units up	

Complete the table below

Point	The image of a point by reflecting on	
	Y-axis	**X-axis**
a. (-4 , 2)	(…….. , ……..)	(…….. , ……..)
b. (-2$\frac{1}{2}$, -1)	(…….. , ……..)	(…….. , ……..)
c. (3 , -2$\frac{1}{4}$)	(…….. , ……..)	(…….. , ……..)
d. (5 , -6)	(…….. , ……..)	(…….. , ……..)



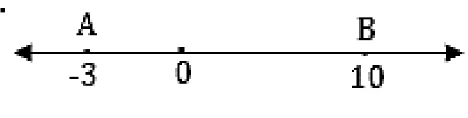
Lesson 4: Exploring The Distance Between Points On A Line

Remember the absolute value of a rational number:

- the absolute value of a rational number is its distance from zero.
- Since the distance is always positive, so we use the absolute value,
- to find the distance between two points on a number line.

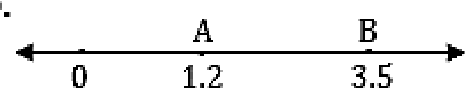
1. Find the distance between the two points A and B in each of the following figures.

a.



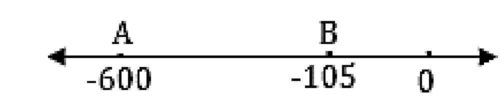
…………………………………………………

b.



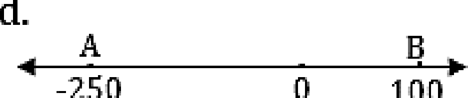
…………………………………………………

c.



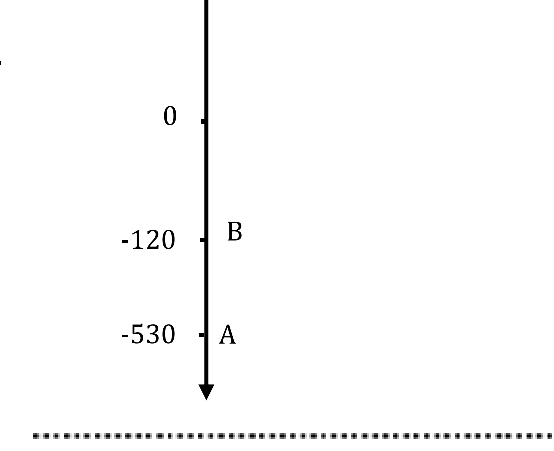
…………………………………………………

d.



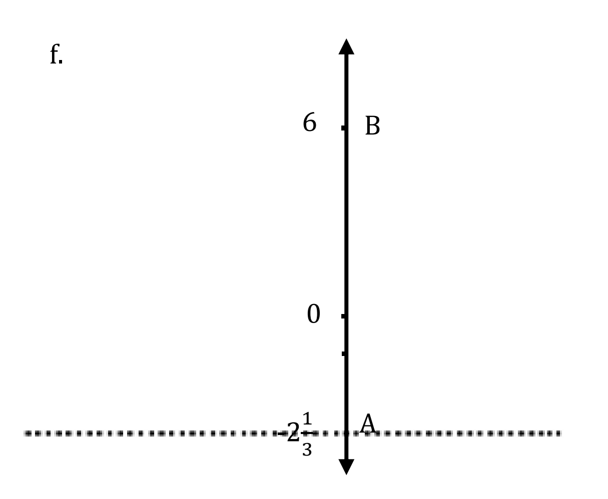
…………………………………………………

e.



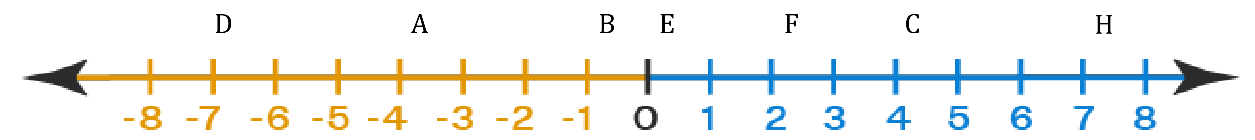
…………………………………………………

f.



…………………………………………………

Using the following horizontal number line Complete the following



a. The distance between A and B is …………………………………

b. The distance between C and F is …………………………………



c. The distance between D and A is …………………………………..

d. The distance between B and H is …………………………………..

e. The distance between E and B is …………………………………..

f. The distance between H and F is …………………………………..

g. The distance between A and C is …………………………………..

h. The distance between E and F is …………………………………..

Find the value of X on each of the following horizontal line:

a. if the distance between A and B = 10 units

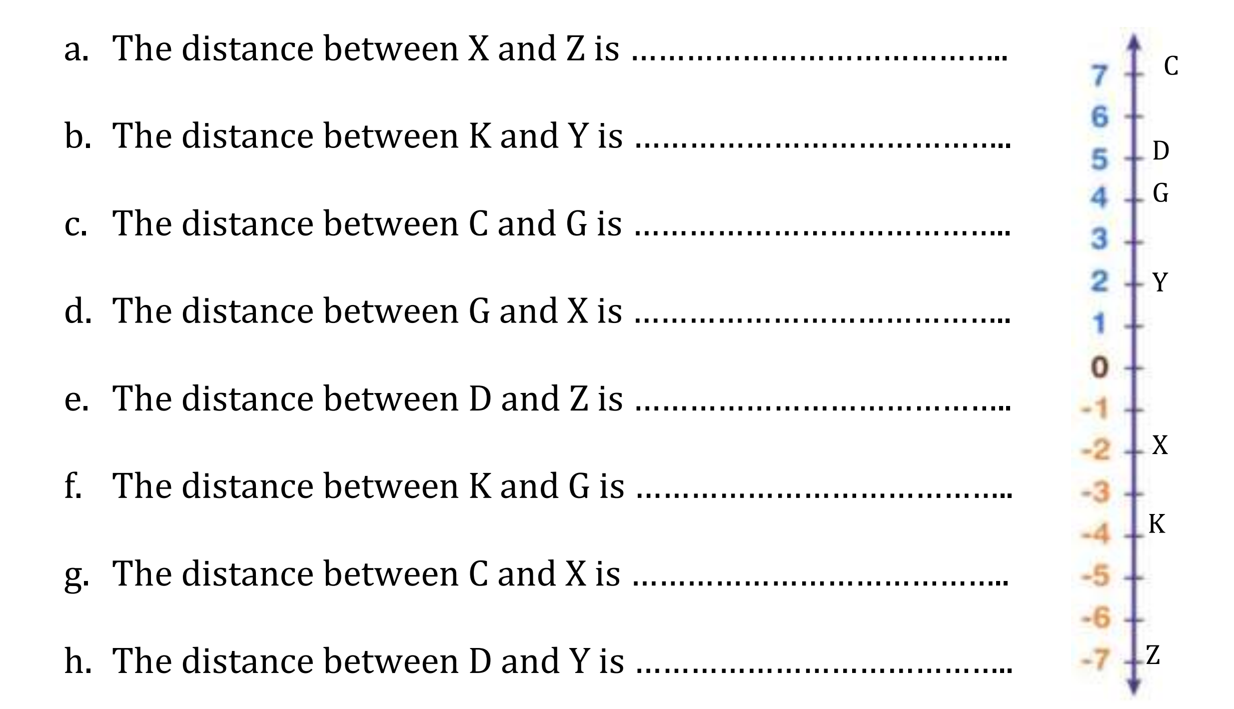


a. if the distance between A and B = 26 units





Using the following horizontal number line Complete the following



a. The distance between X and Z is ……………………………….

b. The distance between K and Y is ……………………………….

c. The distance between C and G is ……………………………….

d. The distance between G and X is ……………………………….

e. The distance between D and Z is ……………………………….

f. The distance between K and G is ……………………………….

g. The distance between C and X is ……………………………….

h. The distance between D and Y is ……………………………….

Find the value of X on each of the following vertical line:



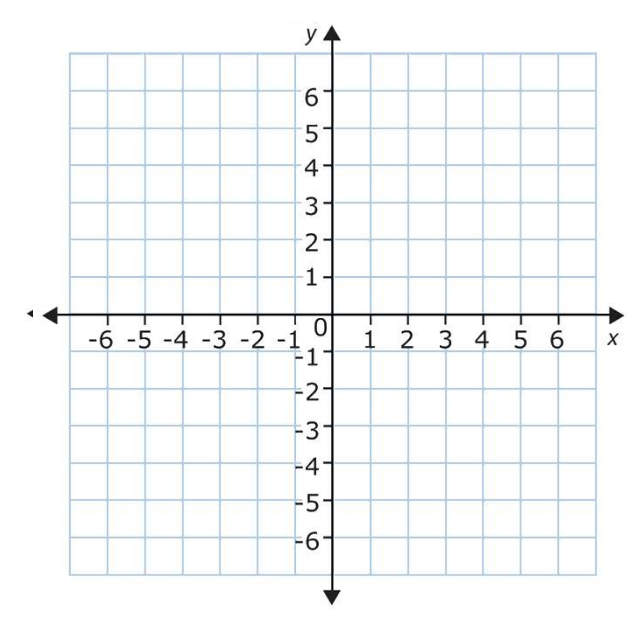
…………………………………………… ……………………………………………



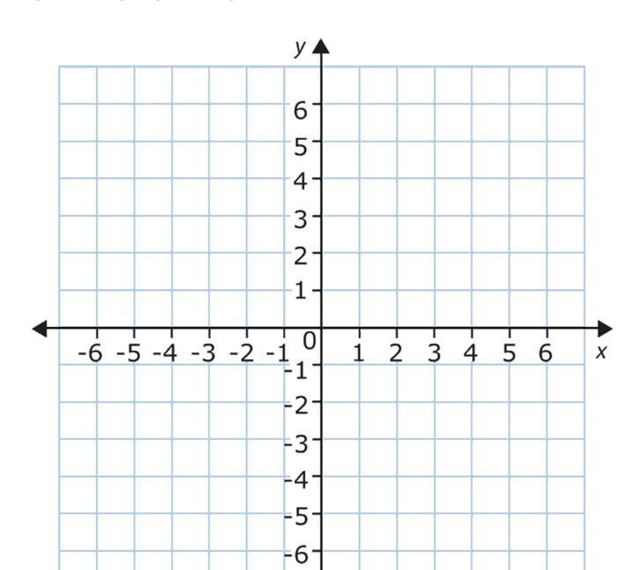
Lesson 5: Exploring Distance Between Points On A Coordinate Plane

plot each of ordered pair. Join the points, find the length of the resulted line segment

a. (4 , -1) , (4 , -5)



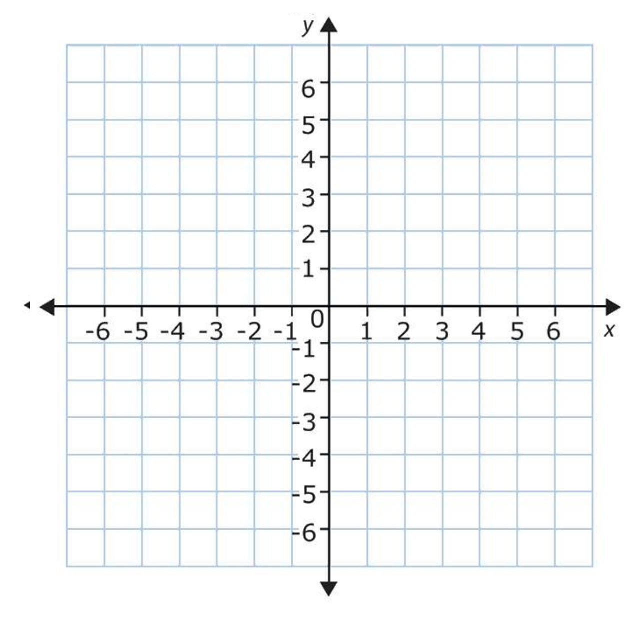
b. (-5 , -1) , (4 , -1)



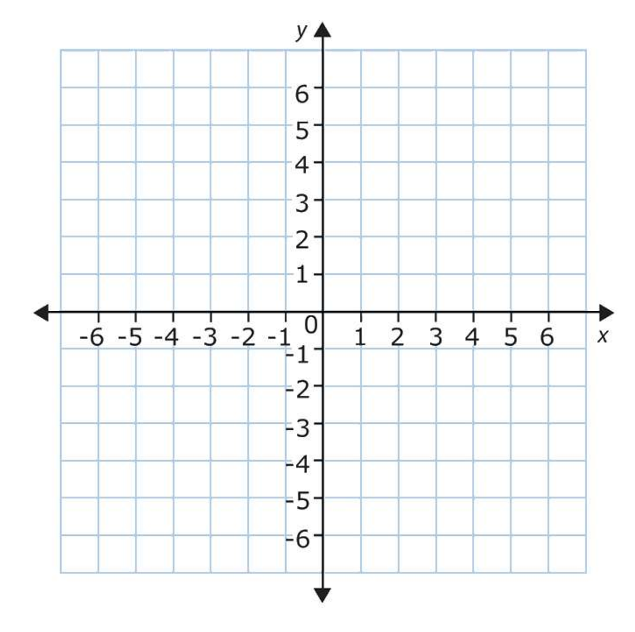
Length of the line segment = ……………

Length of the line segment = ……………

c. (-1 , 2) , (5 , 2)



d. (-3 , 2) , (-3 , -5)



Length of the line segment = ……………

Length of the line segment = ……………

Locate the following points on the coordinate plane , then find



A(5 , -2) , B(1 , 4) , C(5 , 3) , D(-1 , 4) , E(5 , -5) , F (1 , 3)

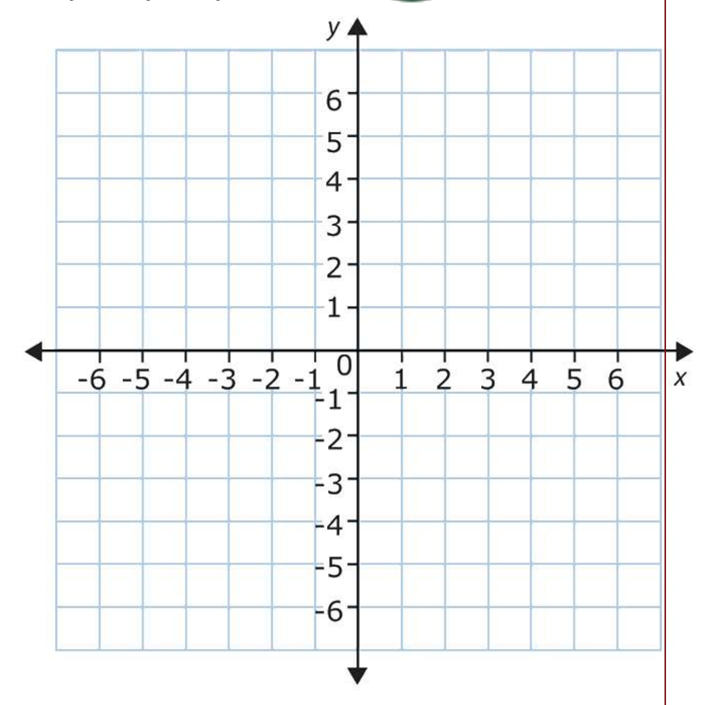
a. The length of AC = ……………. units

b. The length of BD = ……………. units

c. The length of CF = ……………. units

d. The length of EC = ……………. units

e. The length of AE = ……………. units



Answer the following

1. Hany is standing at (11 , -11). His friend Kareem is standing at (1 , -11). If Hany walks 10 units to the right, will he be standing with Kareem ?

   Explain

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………

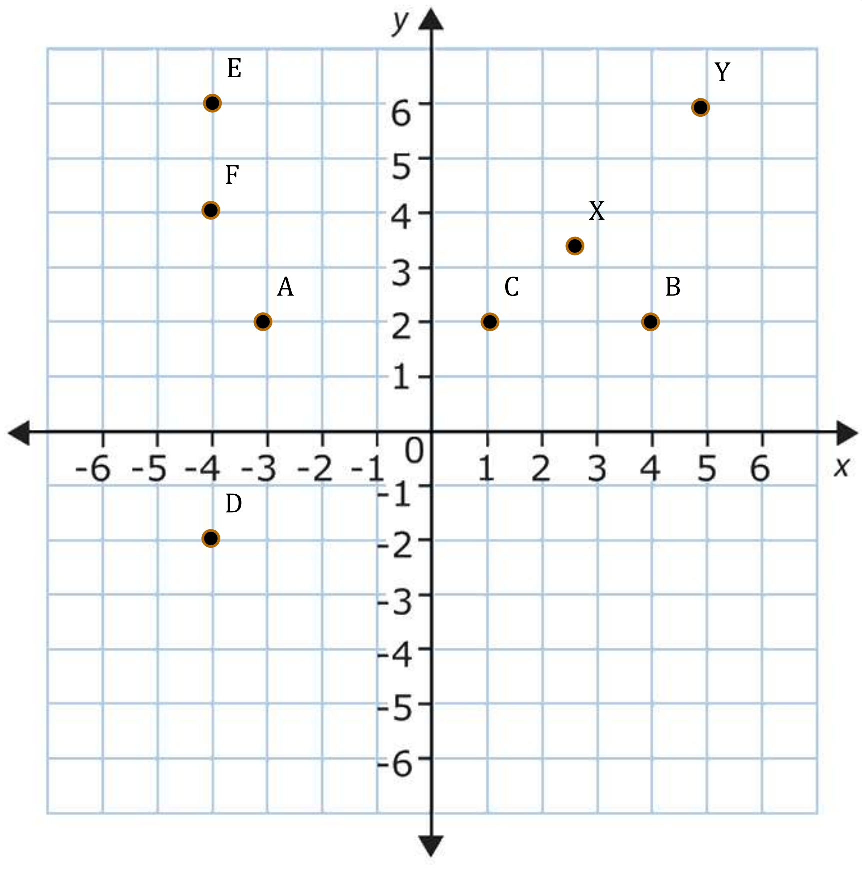
2. Mona walks from a park located at (-4 , -3) to her house at (- 4 , 5). How far did she walk?

……………………………………………………………………………………………………

……………………………………………………………………………………………………



Using the following coordinate plane, find the distance between the two points



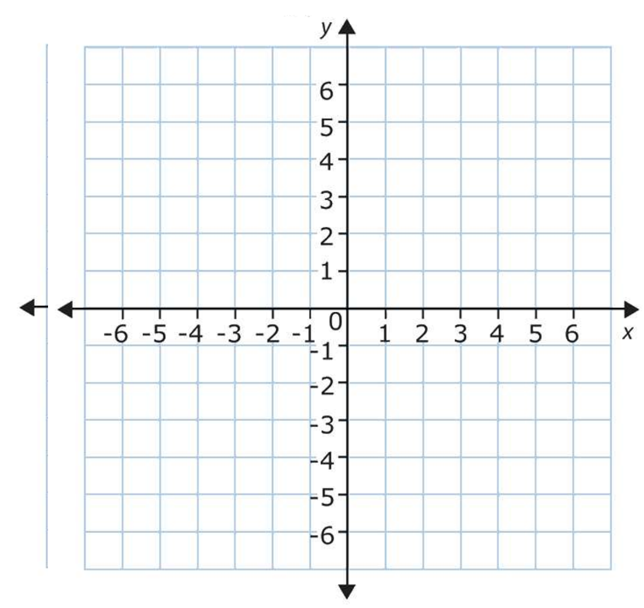
1. *A (……. , …….) and B (……. , …….) = ……………………….. units*
2. *B (……. , …….) and C (……. , …….) = ……………………….. units*
3. *D (……. , …….) and E (……. , …….) = ……………………….. units*
4. *E (……. , …….) and F (……. , …….) = ……………………….. units*
5. *A (……. , …….) and C (……. , …….) = ……………………….. units*
6. *X (……. , …….) and F (……. , …….) = ……………………….. units*
7. *E (……. , …….) and Y (……. , …….) = ……………………….. units*
8. *F (……. , …….) and D (……. , …….) = ……………………….. units*



Lesson 6: Create Geometric Shapes In The Coordinate Plane

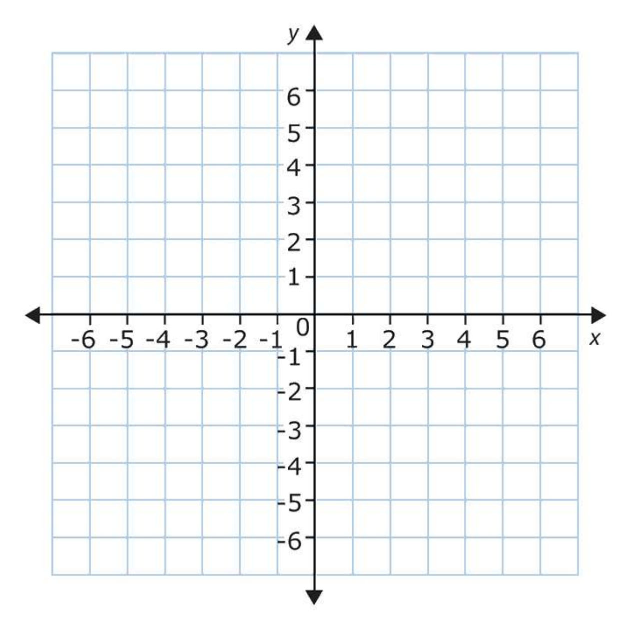
Plot and join the points in the given order. Identify the shape

1. A(5 , 3) , B(5 , -3) , C(2 , -3) , D(2 , 3)



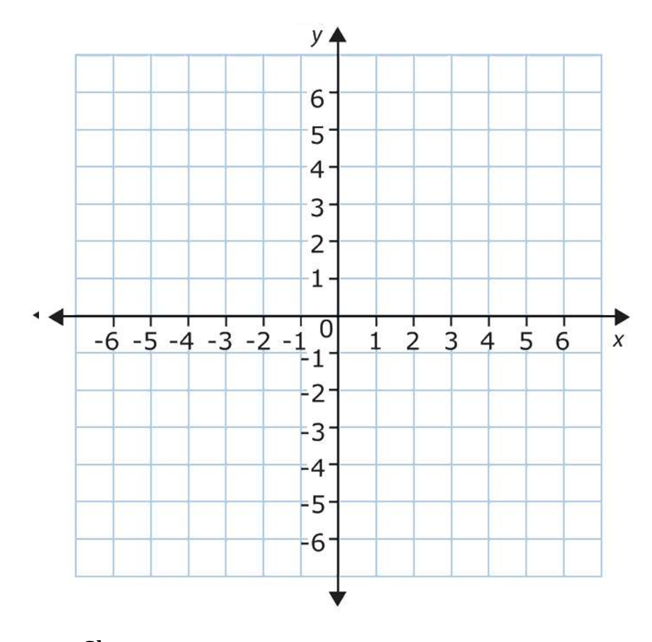
Shape : ....

2. E(1 , 2) , F(1 , -2) , G(-3 , -2)



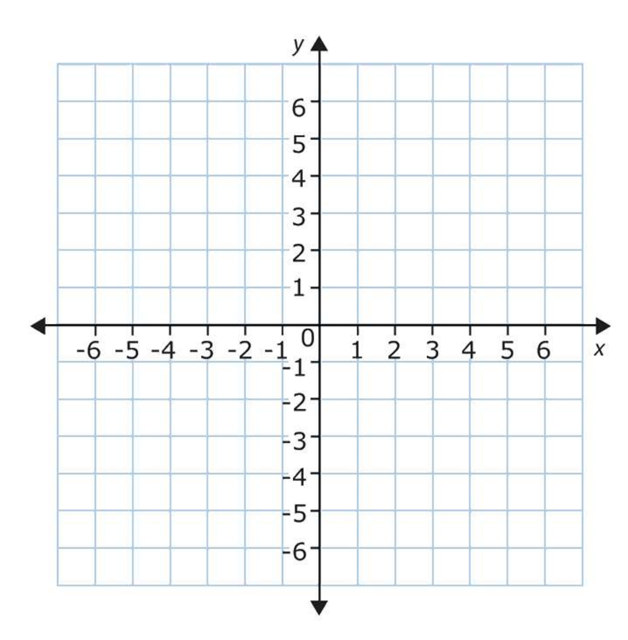
Shape : ....

3. I(-2 , -1) , J(1 , -1) , K(1 , -4) , L(-2 , -4)



Shape : ....

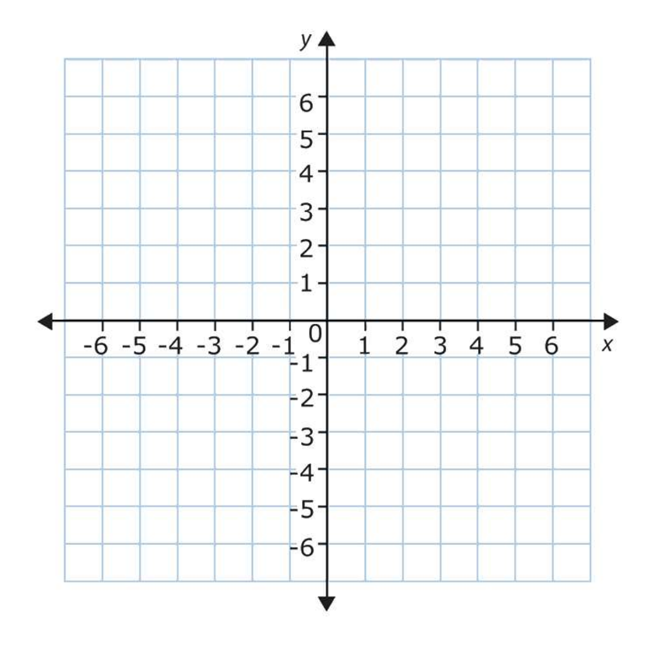
4. Q(-2 , -2) , X(-2 , 2) , Y(2 , 2) , Z(2 , -2)

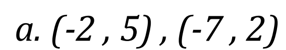


Shape : ....



suppose you used the point (-2 , 2) as a vertex to create a right triangle with lengths of 3 units and 5 units which sets of coordinates could represent the other vertices?





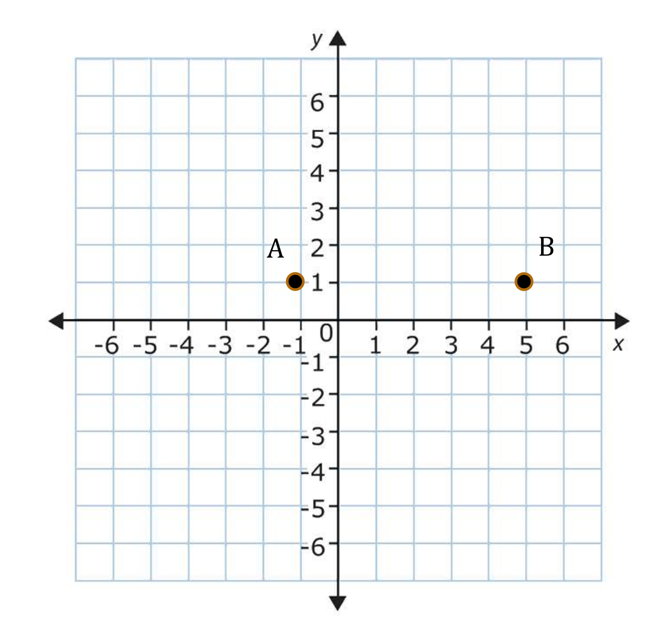
a. (-2 , 5) , (-7 , 2)

b. (-2 , -3) , (3 , -3)

c. (1 , 2) , (-2 , 7)

d. (-2 , -7) , (1 , -7)

In the opposite figure



1. *Write the coordinates of A and B*

   ……………………………………………

2. *Find the distance between the two points A and B*

   ……………………………………………

3. *Find the coordinate of the two points C and D such that ABCD is a square*

   ……………………………………………

4. *Find the coordinate of the two points E and F such that ABEF is a rectangle its width = 3 units*

   ……………………………………………



Choose the correct answer

1. If the two points A (1 , 2) and B (5 , 4) are two vertices of a right-angled triangle ABC , then the point C could be ……………………..

   a) (1 , 4) b) (1 , 3) c) (3 , 1) d) (4 , 1)

2. If the point (4 , 1) is one of the vertices of a square, its side length is 4 units , then the other vertices of the square could be …………………

   a) (4 , -2) , (1 , 4) , (1 , -2) b) (0 , 1) , (0 , -3) , (4 , -3)

   c) (2 , 1) , (2 , -1) , (4 , -1) d) (4 , 4) , (0 , 4) , (0 , 1)

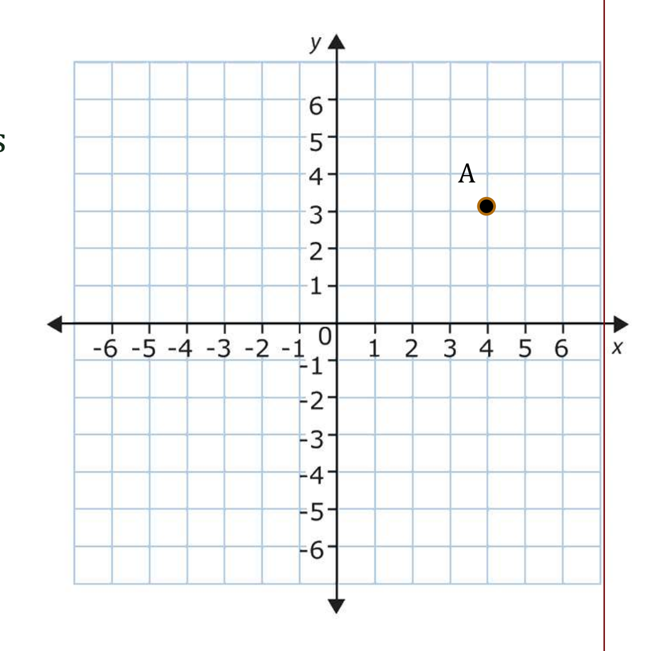
3. If A (1 , -1) and B (4 , -1) are two vertices of a rectangle, its side length 5 units then the other two vertices are …………..

   a) (4 , -3) , (1 , -3) b) (4 , 5) , (1 , 5)

   c) (4 , 4) , (1 , 4) d) (4 , -4) , (1 , -4)

4. In the opposite figure

   If B is the image of A by reflection in the x-axis and D is the image of A by reflection in the y-axis, then the coordinates of the point C such that ABCD is a rectangle are ………..



   a) (-3 , -4) b) (-4 , -3) c) (4 , -3) d) (3 , -4

UNIT 12 : AREA OF SOME POLYGON

Lesson 1 Area Of Parallelogram

The parallelogram : is quadrilateral in which Each two opposite sides are equal in length And parallel

Each side of parallelogram could be

Considered as base of it

The height of the parallelogram is the length of

Perpendicular line segment from a base to the opp

ABCD is parallelogram ,



AB\\CD AB=CD

AD\\BC AD=BC

DE greater height is corresponding to AB (smaller base)

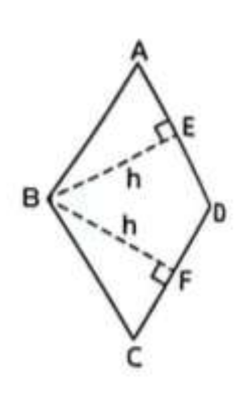
DF(smaller height)is corresponding to BC(greater base)

Rule

Area of parallelogram= the base length x height

A= B X H

Base =Area ÷ height , height= Area ÷ base



Area of rhombus:

Rhombus is parallelogram whose four sides are equa

Area of rhombus=side length x height

Find the area of parallelogram

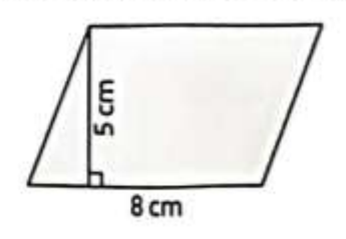
4) what is the area of the parallelogram with base length 12.5 cm and height 4 cm ?



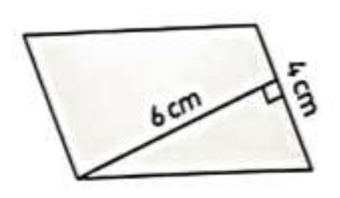
Example 1

Find the area of each of the following parallelograms.

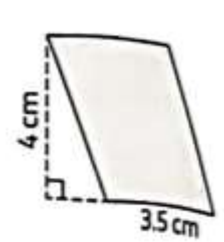
a.



b.



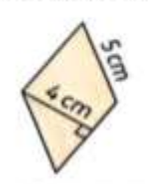
c.



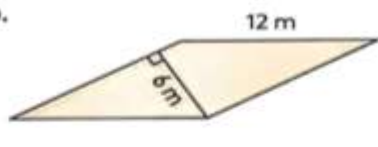
[2]

Find the area of each of the following rhombuses.

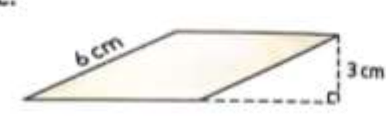
a.



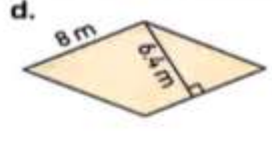
b.



c.



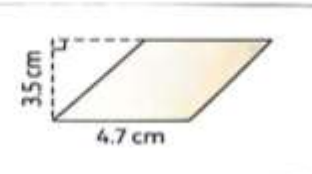
d.



e.



f.



[3]

Find the area of each polygon.

a. Parallelogram:
b = 8 cm , h = 9 cm

b. Rhombus:
S = 7 cm , h = 4 cm

c. Parallelogram:
b = 12 cm , h = 7 cm

d. Parallelogram:
b = 5.4 cm , h = 5 cm

e. Rhombus:
S = 6.2 cm , h = 4.4 cm

f. Rhombus:
S = 11.1 cm , h = 2.9 cm



Lessons 2&3 : Area Of The Right –Angled Triangle

Area Of Acute And Obtuse Triangle

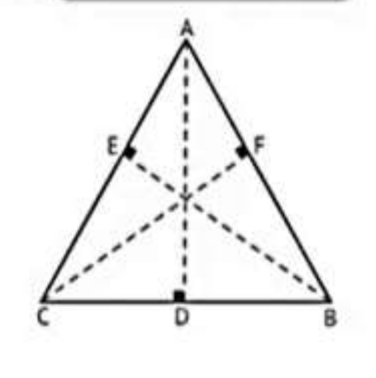
Triangle

It is a two-dimensional shape with 3 sides.

1 Height of a triangle:

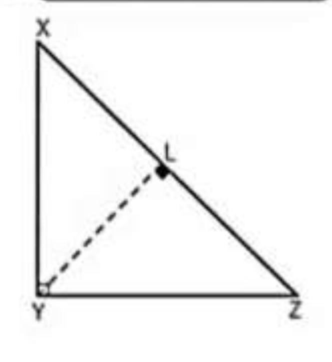
- It is the length of the perpendicular line segment from one vertex of the triangle to the opposite side.
- The heights of the:

a Acute triangle

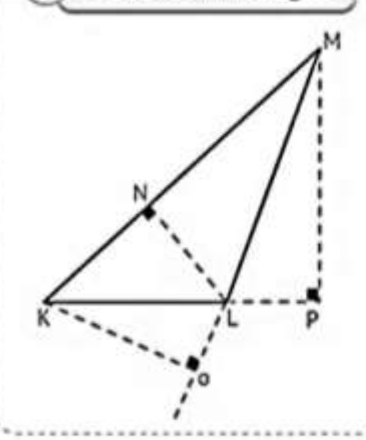


b





c Obtuse triangle



Base	Corresponding Height	Base	Corresponding Height	Base	Corresponding Height
$\overline{AB}$	$\overline{CF}$	$\overline{XZ}$	$\overline{YL}$	$\overline{KM}$	$\overline{LN}$
$\overline{BC}$	$\overline{AD}$	$\overline{XY}$	$\overline{YZ}$	$\overline{KL}$	$\overline{MP}$
$\overline{AC}$	$\overline{BE}$	$\overline{YZ}$	$\overline{XY}$	$\overline{ML}$	$\overline{KO}$

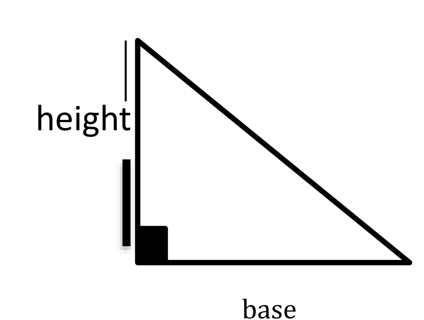


Area Of The Right-Angled Triangle

RULE

The area of the right-angled triangle = $\frac{1}{2}$ × the base length × the height

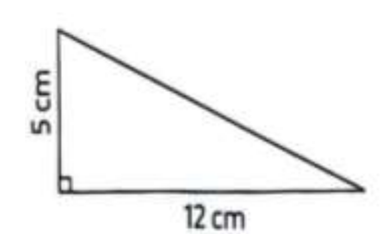
$$A = \frac{1}{2} \times b \times h$$



For Example:

Find the area of these triangles

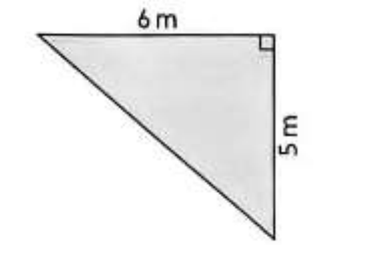
a)



Area= $\frac{1}{2}$ × base × height

A= $\frac{1}{2} \times 12 \times 5 = 30\ cm^2$

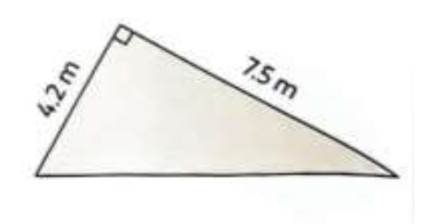
b)



A= ....

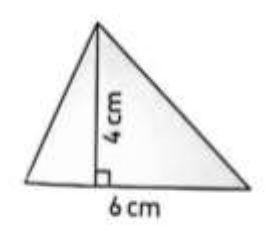
A= ....

c.

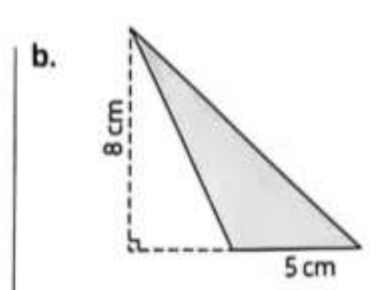




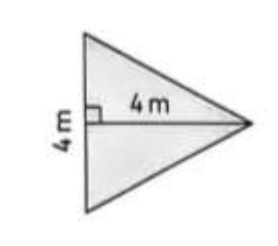
Area of acute and obtuse triangles



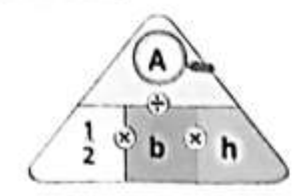
b.



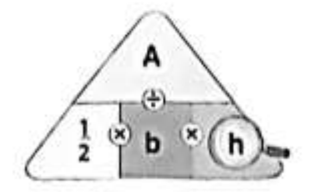
c.



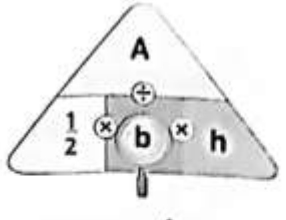
Remark



$A = \frac{1}{2} \times b \times h$



$h = \frac{A}{\frac{1}{2} \times b}$

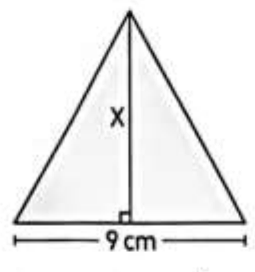


$b = \frac{A}{\frac{1}{2} \times h}$

Example 4

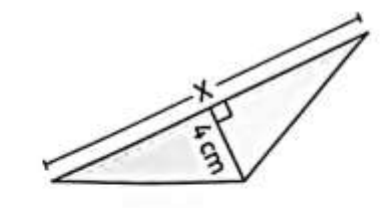
Find the value of X in each of the following.

a.



Area = 36 cm^2

b.



Area = 34 cm^2



1) Find the areas of these triangles.

a. 10 cm, 3 cm

b. 4 cm, 7 cm

c. 5 cm, 6.4 cm

d. 5.2 m, 7 m

e. 5 cm, 4 cm

f. 5 cm, 3 cm

g. 5 cm, 4 cm, 3 cm

h. 10 cm, 8 cm, 10 cm, 12 cm

i. 7 cm, 4 cm, 4 cm

2) find the area of the triangle whose base length is 6cm and its corresponding height is 4 cm.

……………………………………………………………………………………………………….

3) if the perimeter of an equilateral triangle is 60cm and its area is 173.2 cm^2. Find its height .

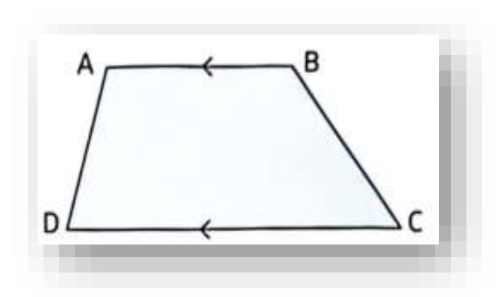


Lesson 4 : Exploring Area of Trapezium

Trapezium is : a quadrilateral having one pair of parallel sides

For example :

The opposite quadrilateral is a trapezium in which AB // CD

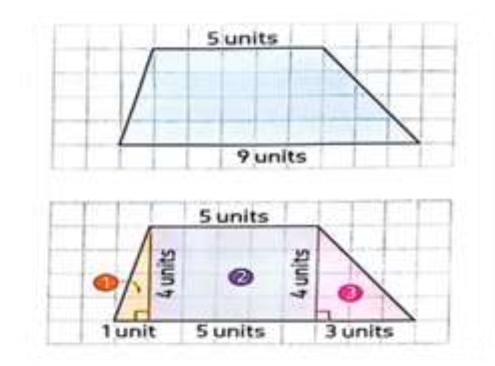


How to find the area of a trapezium ?

1-you can find the area of a trapezium Using composition and decomposition

For example.

You can find the area of the opposite trapezium in different ways



Way (1) :

1- Decompose the trapezium into 3 figures as shown [2 triangles and 1 rectangle].

2-find the area of each figure.

.Area of figure (1) = $\frac{1}{2} \times b \times$ h = $\frac{1}{2} \times 1 \times 4$ = 2 square units .

.Area of figure (2) = L ×W= 5×4 = 20 square units .

.Area of figure (3) = $\frac{1}{2} \times b \times$ h = $\frac{1}{2} \times 3 \times 4$ = 6 square units .



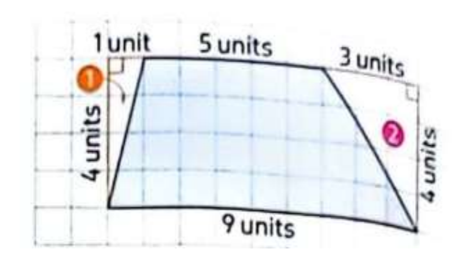
3-Add the areas of the figures to find the area of the whole figure "trapezium."

Area of trapezium= 2 + 20 + 6 = 28 square units

Way 2

1- Complete drawing the trapezium to compose a rectangle as shown.

2- find the area of the rectangle and the area of the two newly drawn triangles.



Area of rectangle = L × W = 9 × 4 = 36 square units .

.Area of figure (1) = $\frac{1}{2} \times b \times$ h = $\frac{1}{2} \times 1 \times 4$ = 2 square units .

.Area of figure (1) = $\frac{1}{2} \times b \times$ h = $\frac{1}{2} \times 3 \times 4$ = 6 square units .

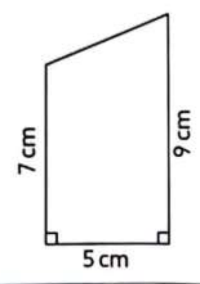
3- Subtract the total area of the two triangles from the area of the rectangle to get the area of the trapezium.

Area of trapezium = 36 – [2 + 6] = 36 – 8 = 28 square units

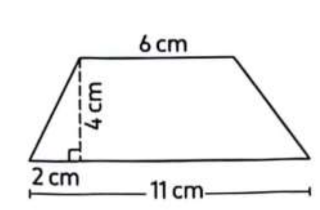
Exercise :

(1) Find the area of each trapezium .

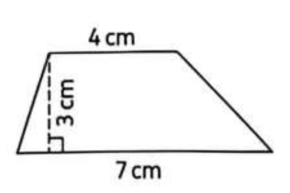
a.



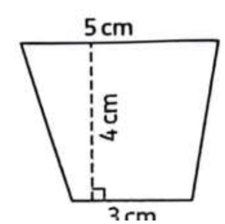
b.



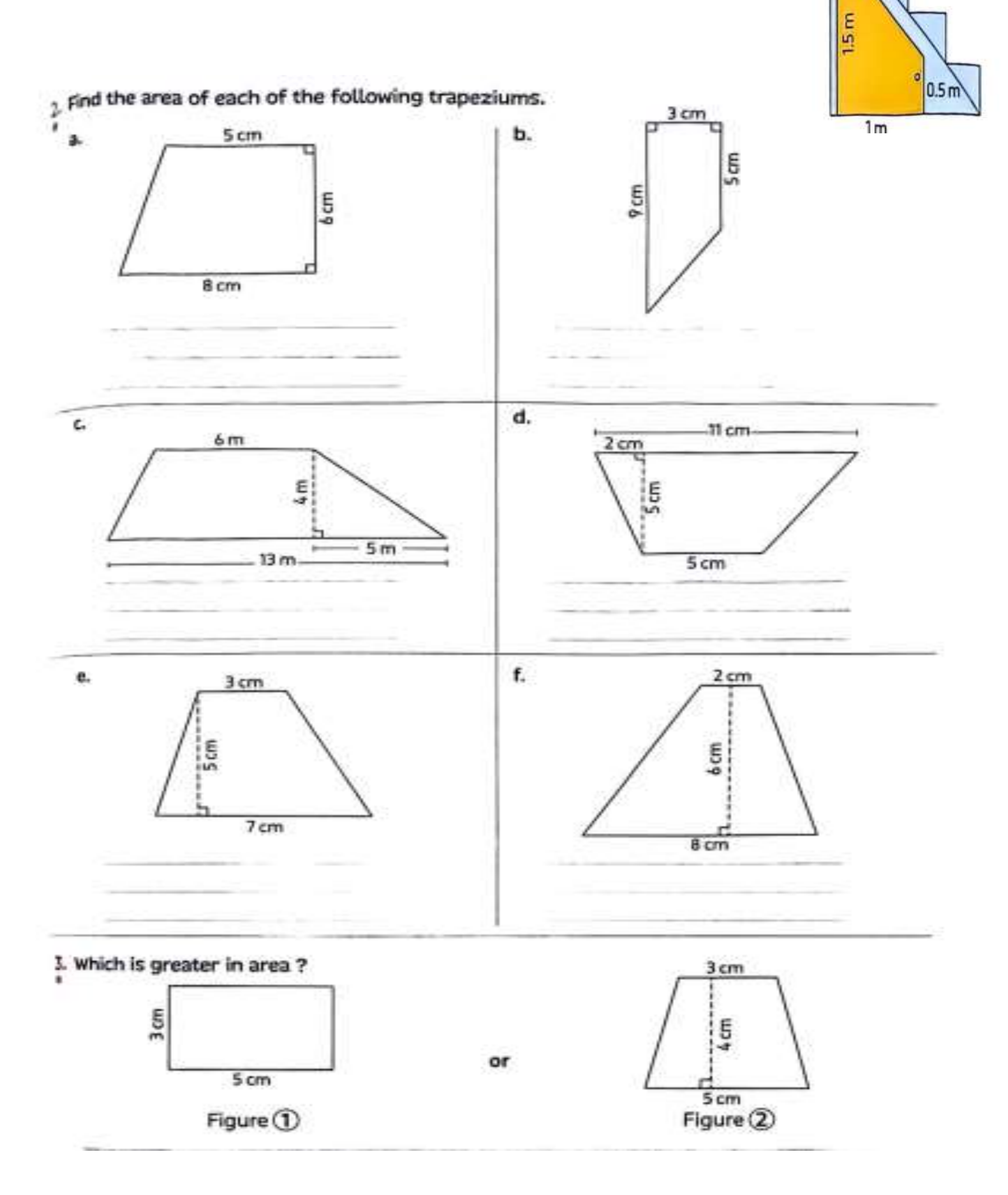
c.



d.



(2) A door in the form of a trapezium it is required to be painted , the price of one square meter of painting is 40 L.E . How much does it cost to paint one face of a door ?



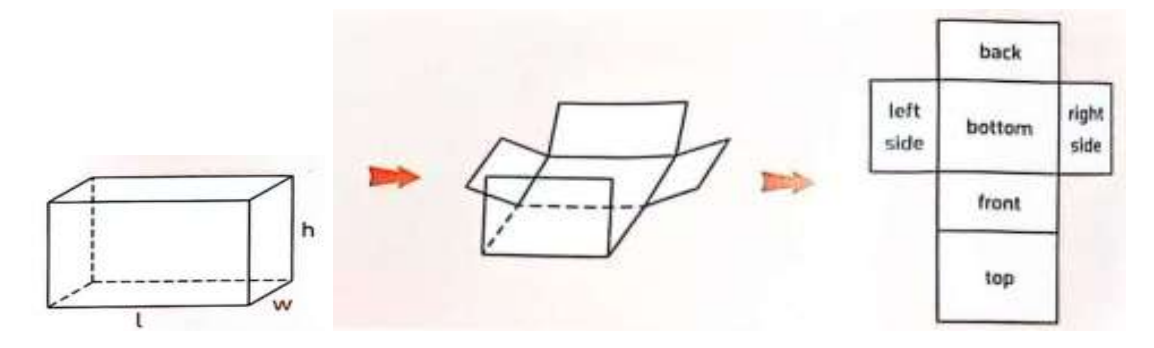


UNIT 13 : SURFACE AREA AND VOLUME

Lesson 1 Surface Area Of A Cuboid

First: Surface Area of a Cuboid

To calculate the total surface area we need to represent the solid in a net.



Method 1

• The surface area is the sum of all of the faces of the cuboid .

Method 2

The surface area=2x (area of front)+2x (area of side)+ 2x (area of top)

Method

The surface area =2x (area of front + area of side+ area of top)

FINALLY

The surface area of cuboid (SA) =

=lw + lw + lh + lh + wh + wh

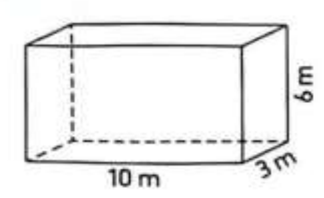
=2 x (lw) + 2 x (lh) +2 x (wh)

= 2 x (lw + lh + wh)

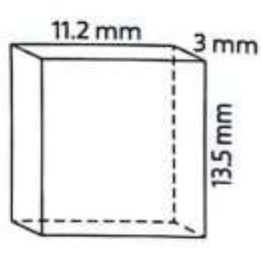


Find the surface area of each cuboid.

a.

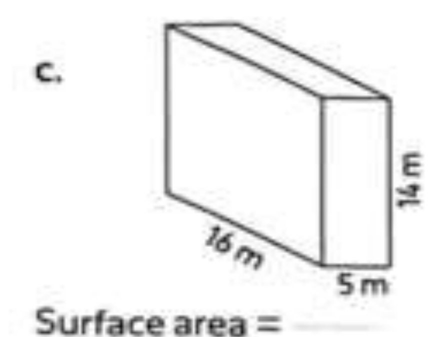


b.



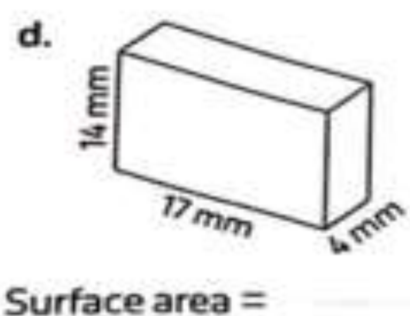
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………………………………………………………………………………………………………
………………………………………………………………………………………………………
………………………………………………………………………………………………………
………

c.



Surface area =

d.



Surface area =

………………………………………………………………………………………………………
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What is the surface area of each of the following?

a. A cuboid that has a length of 6 cm, a width of 3 cm and a height of 9 cm.

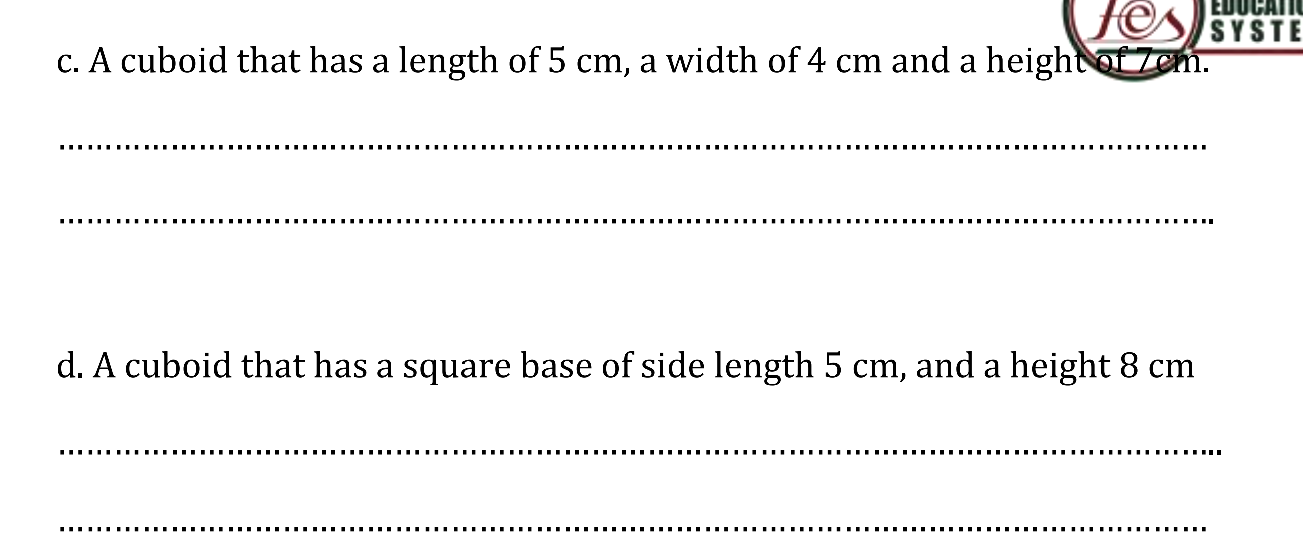
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b. A cuboid that has a length of 7.2 m, a width of 4 m and a height of 2.5 m.

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……………………………………………………………………………………………………



c. A cuboid that has a length of 5 cm, a width of 4 cm and a height of 7cm.

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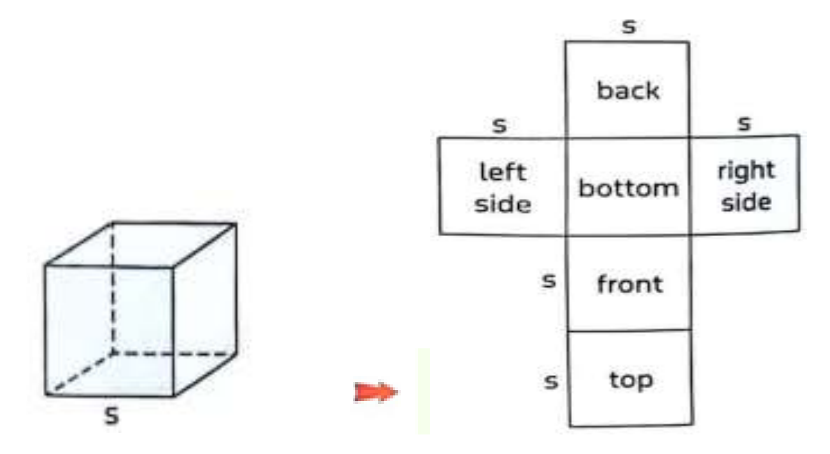
d. A cuboid that has a square base of side length 5 cm, and a height 8 cm

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……………………………………………………………………………………………………

Second : Surface Area of a Cube

To calculate the total surface area we need to represent the solid in a net.



The surface area of a cube (SA) =

= 6 x area of one face

= 6 x S x S

= 6 x S^2



1) Find the surface area of each cube of the following :

a.

6 m

……………………………………..

……………………………………..

b.

7.5 cm

……………………………………..

……………………………………..

c.

14 m

……………………………………..

……………………………………..

2) What is the surface area of each of the following?

a. A cube of side length 3.6 m .

……………………………………………………………………………………………………

……………………………………………………………………………………………………

b. A cube where the perimeter of one of its faces is 28 cm.

……………………………………………………………………………………………………

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3) Which has the greater surface area;

a cube of side length 10 cm or a cuboid of length 10 cm, width 9 cm and high 11 cm.

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4) A painter paints a door before he installs it. The door is 178 centimeters high, 80 cm long, and 5 cm wide. Find the surface area of the door so that the painter can figure out how much paint to buy. Explain how you found your answer.

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5) Nada made a cubical box out of sheet metal for an art project. The side length of the box is 8 centimeters. What is the surface area of the sheet metal did she use?

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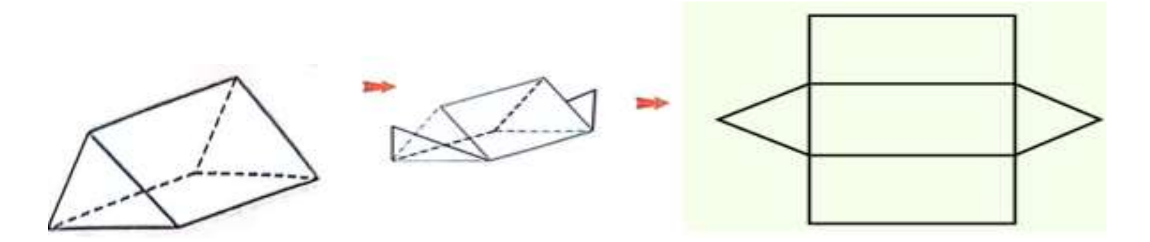
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Lesson 2 : Exploring Surface Area Of Prism And Pyramid

First : Surface Area Of Prism

To calculate the total surface area we need to represent the solid in a net.



Rule

Surface area of a triangular prism =

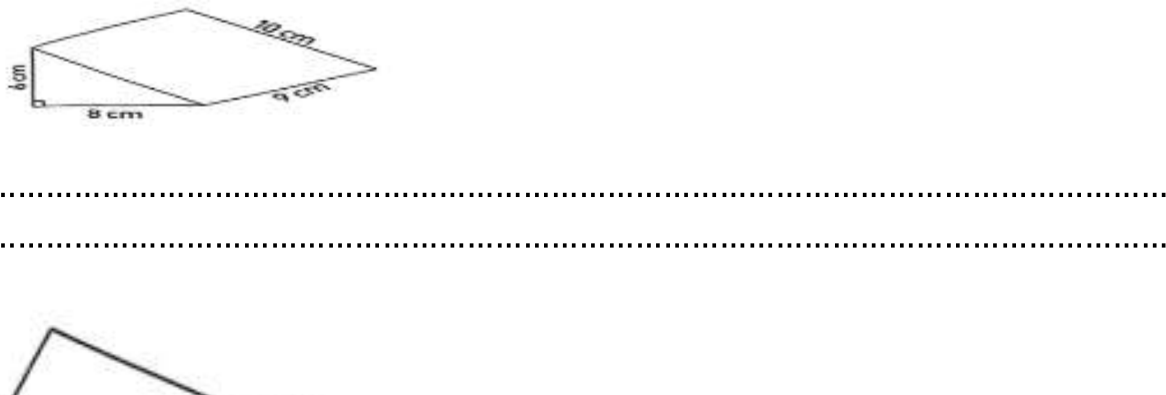
= area of 3 rectangular faces + area of 2 triangular bases

Remember :_

Area of a rectangle = length x width

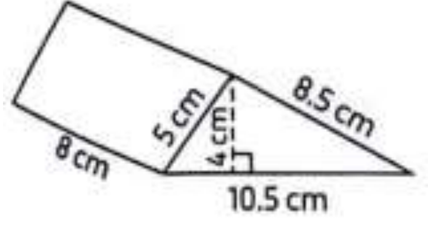
Area of a Triangle = $\frac{1}{2}$ base x hight

Q1) Find the surface area of each of the following triangular prisms :



……

……



……

……



20 mm
20 mm
12 mm
16 mm

………

………

……

15 cm
6 cm
8 cm
4.8 cm
10 cm

………

………

……...

6 cm
4.8 cm
5 cm
3 cm
5 cm

………

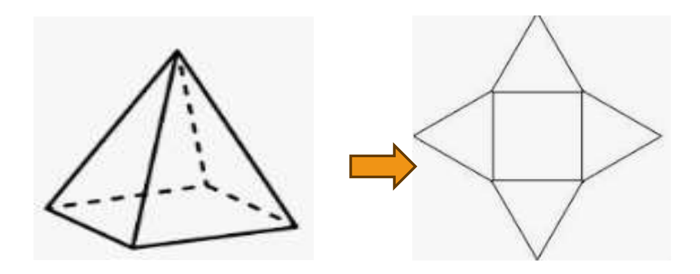
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Second : Surface Area of a Square Pyramid

To calculate the total surface area we need to represent the solid in a net.

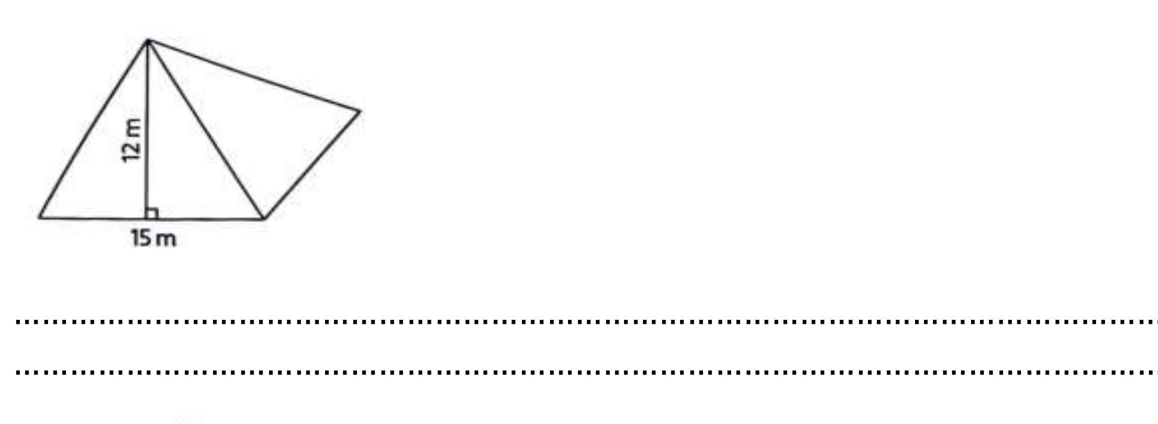


Rule

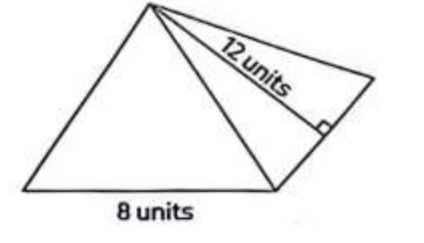
Surface area of square pyramid [SA] = area of base + 4 x area of triangular face.

<u>Exercise</u>

1) Find the surface area of each of the following Square Pyramids :



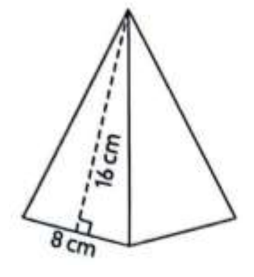
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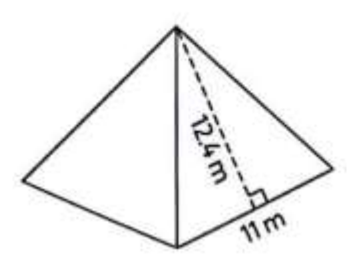
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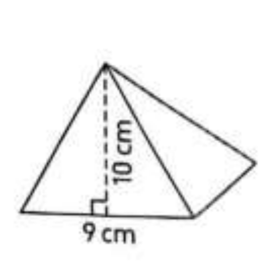


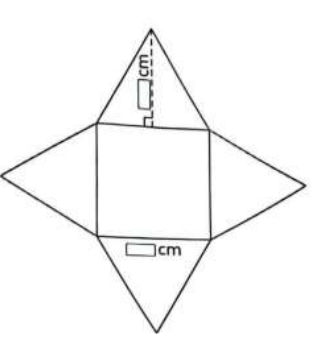
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2) Write the length of each missing side on the net representing the opposite square pyramid, then complete the following table to calculate the surface area of the square pyramid.

Face	Area
Triangular face	______
Square - base	______





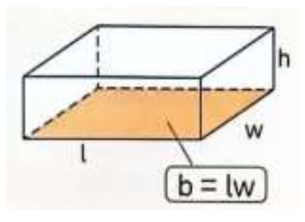
Surface area = ………………….. + 4 x ………..

= …………………….cm2

Lesson 3 & 4 : Application On Volume , Volume Of Cuboid With Known Ratios

First : Application On Volume

Remember



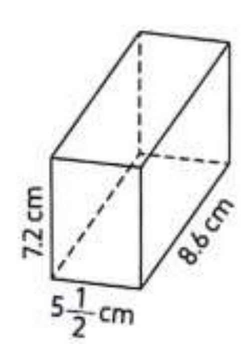
Volume of cuboid [V]

= length x width x height = (L x w x h)

= base area x height = b x h

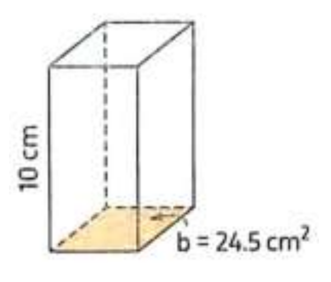
Exercises

1) Find the volume of each cuboid



………

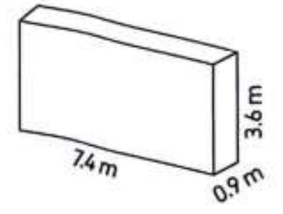
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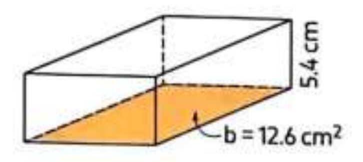
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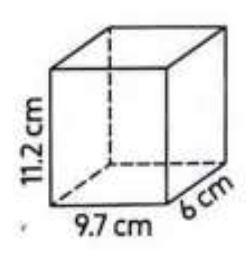




………
………



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Second: <u>Volume of cuboid with known ratios</u>

Doubling one or more of the dimensions of a cuboid affects its volume.

for example: The following table shows the changing of the volume of a cuboid at doubling one or more of its dimensions.



	Length (cm)	Width (cm)	Height (cm)	Volume (cm^3)
Original cuboid	5	4	3	60
(1) Doubling one dimension	10	4	3	120
(2) Doubling two dimensions	10	8	3	240
(3) Doubling three dimensions	10	8	6	480

From the previous table, we deduce that:

1) The ratio of the new volume to the original when you doubled one dimension is 2 : 1 [120 : 60 = 2 : 1]
2) The ratio of the new volume to the original volume when you doubled two dimensions is 4 : 1 [240 : 60 = 4 : 1]
3) The ratio of the new volume to the original volume when you doubled three dimensions is 8 : 1 [480 : 60 = 8 : 1]

Notice that

1 . If one dimension of a cuboid is tripled,

then the ratio of the new volume to the original volume is 3:1

2. If two dimensions of a cuboid are tripled, then the ratio of the new volume to the original volume is 9:1

3. If three dimensions of a cuboid are tripled, then the ratio of the new volume to the original volume is 27:1

4. If one dimension of a cuboid is divided in half (replaced by its half), then the ratio of the new volume to the original volume is 1:2



Exercise

1) The volume of a cuboid is 48 cm^3**.** If its three dimensions are doubled, then **find** the new volume of the cuboid.

………
…………………………………………………………………………………

………………………………………………………………………………………………

2) If the dimensions of a cuboid are 24.6 cm, 12.8 cm and 5.2 cm**, find**.

a. The volume of the cuboid.
   ……………………………………………………………………………………

b. The new volume of the cuboid when one of its dimensions is doubled.
   ……………………………………………………………………………………

c. The new volume of the cuboid when all dimensions are doubled.
   ……………………………………………………………………………………

3) Find the volume of each cuboid

a)

Area = 7.5 m^2

9 m

………
………
………



b)

7 cm
5.6 cm
6.3 cm

………………………………………………………………………………………………………

………………………………………………………………………………………………………

c)

$6\frac{1}{2}$ cm
Area = 20 cm²

………………………………………………………………………………………………………

……………………………………………………………………………

4) Estimate the volume of the cuboid whose dimensions are 5.5 m, 3.5 m and 4.5 m, then find the actual volume of the cuboid.

………………………………………………………………………………………………………

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5) Find the volume of the cuboid whose dimensions are 6m 5 m and 3.5 m

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Revision On Unit 13

1. Choose the correct answer.

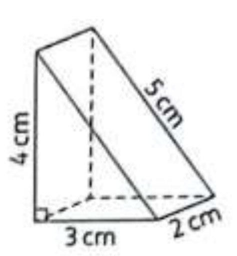
1. The surface area of the cube whose side length is [s] =

A. 65

B. 12 s

C. 6 s 2

D. 12 s 2



2. The surface area of the opposite triangular prism is cm2

A. 24

B. 36

C. 48

D. 56

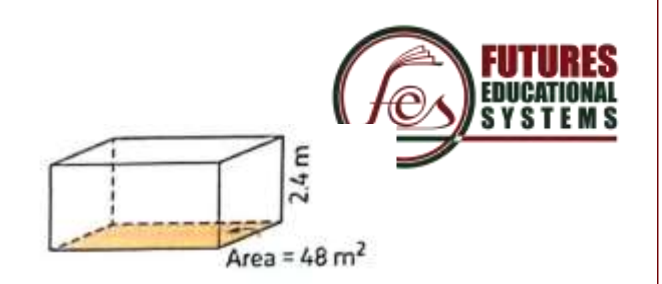
3. The volume of the cuboid =

A. l + w + h

B. 2 l w h

C. l w h

D. (I w h) /2



4. The volume of the opposite cuboid =

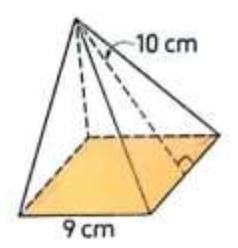
A. 120

B. 84.2

C. 224.2

D. 115.2

5. The surface area of the opposite square pyramid is ………… cm 2



A. 148

C. 240

B. 156

D. 261

6. If the three dimensions of a cuboid are doubled, then the ratio between the new volume to the original volume of the cuboid is ………………………..

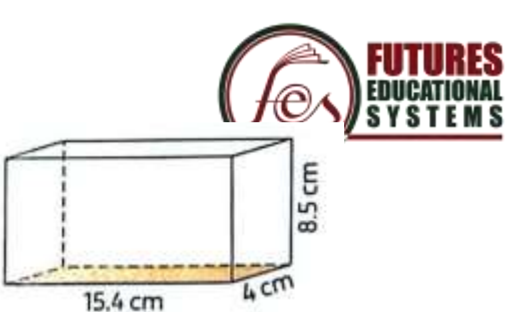
A. 8 : 1

C. 4 : 1

B. 1: 8

D. 1 : 4

Q2) Answer the following questions.



1. The opposite figure is a cuboid, then calculate.

………………………………………………………………………………………………

2. The surface area of the cuboid and The volume of the cuboid

……..

……

………………………………………………………………………………………………………

3. Calculate the surface area of the opposite square pyramid.

………………………………………………………………………………………………

………………………………………………………………………………………………

4. Calculate the surface area of the opposite triangular prism.

………………………………………………………………………………………………

………………………………………………………………………………………………

7. A cuboid with dimensions 14.3 cm, 10.2 cm and 8 cm

Find the volume of the cuboid. **And** If the three dimensions of the cuboid are doubled, **find** the new volume of the cuboid

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8. A juice case is in the shape of cuboid, its base is square shaped of side length 6.5 cm and Is height is 15 cm, **calculate** the volume of juice which fills the case completely.

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9. **Which is greater** in volume, a cuboid of dimensions 14.9 cm, 8.7 cm and 6.6 cm or a cuboid whose base area is 75.6 cm2 and its height is 12.5 cm ?

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10. A cuboid of dimensions 4.2 m, 5.3 m and 7 m and another cuboid in which the area of its 3seis 15.4 m2 and of height 8.8 m

Find the difference between their volumes.

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11 . A cuboid of a square-shaped base whose perimeter is 61.6 cm and its height is 9.5 cm **Calculate its volume**

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12 . **Complete the table**

	Dimensions of cuboid (m)			Volume (m^3)
	Length	Width	Height	
a.	4.7	2.1	6	______
b.	11.2	8.3	5.4	______
c.	9.3	5	4.4	______
d.	8	$7\frac{1}{2}$	$6\frac{1}{4}$	______